FINAL

ENVIRONMENTAL ASSESSMENT FOR THE MQ-1 PREDATOR AND MQ-9 REAPER UNMANNED AIRCRAFT SYSTEM (UAS) SECOND FORMAL TRAINING UNIT (FTU-2) BEDDOWN

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14. ABSTRACT

This EA has been prepared in accordance with the National Environmental Policy Act. The EA team focused the analysis on the following environmental resources: airspace management, noise, safety, air quality, physical resources, water supply/quality, biological resources, cultural resources, land use, socioeconomics, and environmental justice. Increases in operations and personnel associated with the Proposed Action would occur, but would be equal to or less than the historic numbers of operations and personnel at either installation. Therefore, no or negligible effects on the installations? airspace management, safety, water supply, air quality and transportation systems are expected. Off-base land area would not be subjected to Day/Night Average Sound Levels greater than 65 decibels during construction activities. Noise generated by the operation of the UAS would not be perceptible by the general public. Renovation and construction in previously disturbed base areas would result in no significant effects to physical and biological resources. One building at Holloman AFB and two buildings at Edwards AFB that would require renovation or demolition to accommodate the beddown are considered eligible for listing on the National Register of Historic Places; any disturbance to these structures would need to be coordinated through the respective State Historic Preservation Office. Short-term regional socioeconomic stimulation is anticipated from renovation and construction. Long-term personnel and population increases are anticipated from the proposed beddown, with concomitant increases in regional income, sales volumes, and taxes. There would be no disproportionate effects upon minorities or low-income populations or children.

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FINDING OF NO SIGNIFICANT IMPACT

1.0 NAME OF PROPOSED ACTION

MQ-1 Predator and MQ-9 Reaper Unmanned Aircraft System (UAS) Second Formal Training Unit (FTU-2) Beddown, Holloman Air Force Base, New Mexico and Edwards Air Force Base, California

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The U.S. Air Force, Headquarters Air Combat Command (ACC), proposes to stand-up a second Unmanned Aircraft System (UAS) Formal Training Unit (FTU-2) and relocate the existing FTU currently operated at Creech Air Force Base (AFB), Nevada, to another location. The beddown will consist of 38 MQ-1 Predator and MQ-9 Reaper UAS aircraft and up to 800 personnel (600 permanent and 200 students). The proposed action would also involve construction and renovation of facilities to support the beddown.

Three alternatives, including the No Action Alternative, were analyzed in detail in the environmental assessment (EA). Under either of the two action alternatives, five squadrons, consisting of 200 officers and 250 enlisted member permanent party personnel, would beddown at the installation, supported by 150 contractor personnel. The 200 students would cycle through in 3 month periods. One of the five squadrons would be a Maintenance squadron. The force structure would consist of 38 aircraft comprised of 28 MQ-1s and 10 MQ-9s. There would be 12 Ground Control Stations (GCS) and two Primary Predator Satellite Links. There would be approximately 2,880 sorties per year based on three flying squadrons, of which approximately 480 sorties out of the 2,880 sorties would be conducted at night. This is based on a week of night training (M-F) held every 6 weeks. The day training schedule would be from 0700 to 2200 hours, while the night training would be held from 2200 to 0700 hours. Live and inert munitions would be used on established training ranges that have been authorized to receive the types of munitions expected to be used by the MQ-1 and MQ-9 aircraft.

The Preferred Alternative is to implement the beddown at the Option A Site at Holloman AFB, New Mexico. Approximately 200,000 square feet of existing and unoccupied facilities including office buildings and maintenance hangars are available for use at Holloman AFB. As such, initial "flag standup" for FTU-2 is supportable at any time. Only minor renovations to select facilities would be required. However, a taxiway would be constructed parallel to Runway 16/34 to reduce the amount of taxi time required for UAS platforms to access the primary runways.

Alternative 1 would involve the implementation of the beddown at the North Base site at Edwards AFB, California. Many of Edwards AFB's facilities are currently occupied or would require renovations to initially support the UAS FTU-2 beddown. The majority of the facilities required to support the maintenance and operation of the MQ-1/MQ-9s would be located in the North Base area. The FTU mission would introduce a "school house" environment within the cantonment area of the Main Base. The school house area would provide temporary quarters and training facilities for the students. New facilities would be required to establish the school house area.

3.0 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The EA provides an analysis of potential environmental impacts of the proposed action within the region of influence, which includes Holloman AFB and Edwards AFB and the associated restricted airspace and Air Traffic Controlled Assigned Airspace above, surrounding and near the two bases. Eighteen resource areas were evaluated during the preparation of the EA. No impacts were identified on land use, climate, geology, soils, wetlands, safety and health, and environmental justice. Insignificant impacts would be incurred on local transportation, visual resources, infrastructure, noise, air quality, water resources, cultural resources, biological resources, hazardous material/waste management, socioeconomics, and airspace. The No Action Alternative would result in no change to existing conditions at either installation.

Transportation: The Proposed Action at either base would result in minor to moderate increases in on-base traffic during daily commute of the permanent staff. These increases would be less than historic traffic counts, as both Holloman AFB and Edwards AFB have experienced recent reductions in personnel assigned to the bases. Off-base transportation system would still be well below capacity of the level of services on the public roads.

Visual Resources: Temporary and minor impacts would occur on the area's visual resources during any construction activities. The visual signature of the UAS aircraft during training missions would be similar to that of a Cessna 172. The small, sleek aircraft would be virtually invisible to the public (by design) and would not create a significant impact on visual resources during training exercises.

Infrastructure: The Proposed Action would result in minor increases to utility (power, communication, and wastewater) demands, but these increases would be below historic demands on both bases. Demands on water supplies would be increased during construction activities, but these increases would be temporary and negligible. The increased staff would also result in additional demands on water supplies; however, the amount of increase would be within the current capacity of the water supply systems and below the historic use at both installations.

Noise: Noise emissions from proposed aircraft operations would be insignificant compared to existing operations at Holloman AFB or Edwards AFB. Noise generated during construction activities would be attenuated before reaching the base boundaries and would not affect the general public. No significant impact to the ambient noise levels would occur at either installation.

Air Quality: Air emissions from construction activities would be temporary and well below *de minimis* thresholds; 13.5 tons of nitrogen oxides (NOx) would be generated during construction at Edwards AFB and approximately 17.7 tons of NOx would be generated during the construction at Holloman AFB, which is the highest amount of any of the priority pollutant emissions related to the construction activities. The daily commuter traffic and aircraft operations at Holloman AFB would generate 3 tons per year (tpy) of carbon monoxide (CO), 1.4 tpy of volatile organic compounds (VOC), 3.3 tpy of NOx, 0.5 tpy of particulate matter less than 10 microns (PM-10) and 0.1 tpy of particulate matter less than 2.5 microns (PM-2.5). These activities at Edwards AFB would emit 92 tpy of CO, 10.8 tpy of VOCs, 10.2 tpy of NOx, 0.5 tpy of PM-10, and 0.2 tpy of PM-2.5 The additional emissions at Edwards AFB would be associated with the

longer commute required to access the base. Still, these emissions are below the *de minimis* thresholds and, therefore, a Conformity Analysis would not be required.

Cultural Resources: One building at Holloman AFB that would be used, Building #301, has been recommended eligible for listing on the National Register of Historic Places (NRHP). Concurrence to build exterior additions and installation of fire protection for Building #301 has previously been acquired from the New Mexico State Historic Preservation Office (SHPO). No other potentially eligible cultural resources or cultural resources of unknown eligibility have been reported in previous surveys of the buildings, infrastructure and new taxiway proposed for the FTU beddown at Holloman AFB; thus, no adverse effects on historic properties would be expected.

At Edwards AFB, one building, Building #4305, which is a WWII era hangar, is situated within 100 feet of a proposed demolition and new construction site. Coordination with the California SHPO may be required to avoid or mitigate adverse visual impacts to Building #4305. All other areas to be impacted by the proposed action have no reported cultural resources recommended eligible or unknown eligibility reported.

Biological Resources: Approximately 16 acres of habitat would be permanently lost due to the construction of the proposed taxiway at Holloman AFB. Noise from UAS overflights would have negligible impacts on wildlife or protected species. Live and inert munitions have the potential to affect individual wildlife specimens in the impact areas. However, these target areas are used quite frequently and any losses would not cause significant impacts to wildlife populations. The construction/renovation activities would not affect any Federally or state-listed species. Operation of the UAS may affect, but would not adversely affect, interior least tern (*Sterna antillarum*), southwestern willow flycatcher (*Empidonax trailii extimus*), and Mexican spotted owl (*Strix occidentalis lucida*). The proposed project would not likely jeopardize the northern aplomado falcon (*Falco femoralis septentrionalis*). Within one month prior to the construction of the proposed taxiway, surveys would be conducted to avoid impacts to migratory birds, to identify potential nest sites for the northern aplomado falcon, and to document the presence/absence of aplomado falcons and western burrowing owls.

No significant impacts to biological resources are expected at the North Base area at Edwards AFB. At the school house area site, there could be impacts to desert tortoise (*Gopherus agassizii*), Mohave ground squirrel (*Spermophilus mohavensis*), burrowing owls (*Athene cunicularia*), and desert cymopterus (*Cymopterus deserticola*). If Edwards AFB is selected, formal Section 7 Consultation would be initiated with the U.S. Fish and Wildlife Service.

Hazardous Materials and Waste Management: The Proposed Action at either base would require the use of petroleum, oils, and lubricants, as well as other hazardous materials for operations and maintenance of the aircraft. These materials and any wastes generated by the operation and maintenance would be managed in accordance with U.S. Environmental Protection Agency and Air Force Regulations; therefore, no significant impacts are expected.

Socioeconomics: Temporary short-term and long-term beneficial impacts to revenue in the ROI would occur at either Holloman AFB or Edwards AFB. Short-term, temporary adverse impacts on public services could occur but would not be expected to persist since the increase in base population would be less than historic levels. The increased population and demand for housing units in the ROI would create long-term beneficial impacts.

Airspace: The addition of 2,880 UAS annual sorties would increase the total airfield operations at Holloman AFB by about 7 percent and up to 31 percent at Edwards AFB. These numbers of sorties would still be below historic levels at either installation. Close coordination with Air Force and other Department of Defense (DoD) airspace managers would be required for proper scheduling and to ensure the UAS mission is satisfied without conflicts to other DoD missions.

4.0 CONCLUSION

Based on the analysis of the EA conducted in accordance with the requirements of the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations, and Air Force Instruction (AFI) 32-7061, which is hereby incorporated by reference, and after careful review of the potential impacts, I conclude that implementation of the proposed beddown action at Holloman AFB is the preferred alternative and would not result in significant impacts on the quality of the human or natural environment. Therefore, a Finding of No Significant Impact (FONSI) is warranted, and an Environmental Impact Statement is not required for this action.

Richard J. Wheeler

RICHARD J. WHEELER
Colonel, USAF
Deputy Director of Installations and Mission Support

30 Apr 09
Date

Cover Sheet
ENVIRONMENTAL ASSESSMENT
MQ-1 PREDATOR AND MQ-9 REAPER UNMANNED AIRCRAFT SYSTEM (UAS) SECOND FORMAL TRAINING UNIT (FTU-2) BEDDOWN

a. *Responsible Agency:* United States Air Force (Air Force)

b. *Proposals and Actions:* The Air Force proposes to beddown a second Formal Training Unit (FTU-2) and relocate the existing FTU from Creech Air Force Base (AFB) to another installation. The FTUs provide training in Unmanned Aircraft System (UAS) using the MQ-1 (Predator) and MQ-9 (Reaper) aircraft. Air Combat Command (ACC) must proactively accommodate current demands for Combat Air Patrol (CAP) growth while enabling UAS normalization and long-term sustainment. The FTUs provide training in Unmanned Aircraft Systems using the MQ-1 (Predator) and MQ-9 (Reaper) aircraft. The airspace utilized by Creech AFB is at or near maximum capacity and would not be able to sustain a second UAS FTU while satisfying Air Combat Command's (ACC) requirement to train Combat Air Patrol (CAP) forces for the current global war on terror. Therefore, the Air Force proposes to beddown the MQ-1 Predator and MQ-9 Reaper UAS FTU-2 at another installation and eventually relocate the original FTU from Creech AFB to that same location. Up to 600 permanent staff and contract personnel and 200 students would be assigned to the selected installation. Annual sorties anticipated to be required for MQ-1/MQ-9 training would be approximately 2,880, including up to 480 night-time sorties. Practice and live ordnance would be delivered into approved bombing ranges. No supersonic flights would be associated with either aircraft. Two bases, Holloman AFB, New Mexico and Edwards AFB, California were evaluated as potential sites for the beddown.

c. *For Additional Information:* Telephone inquiries may be made to ACC Public Affairs at 757-764-5014 or locally from the respective bases being considered for the beddown: Holloman AFB Public Affairs (575-572-7383) or Edwards AFB Public Affairs (661-277-3510).

d. *Designation:* Final Environmental Assessment (EA)

e. *Abstract:* This EA has been prepared in accordance with the National Environmental Policy Act. The EA team focused the analysis on the following environmental resources: airspace management, noise, safety, air quality, physical resources, water supply/quality, biological resources, cultural resources, land use, socioeconomics, and environmental justice. Increases in operations and personnel associated with the Proposed Action would occur, but would be equal to or less than the historic numbers of operations and personnel at either installation. Therefore, no or negligible effects on the installations' airspace management, safety, water supply, air quality and transportation systems are expected. Off-base land area would not be subjected to Day/Night Average Sound Levels greater than 65 decibels during construction activities. Noise generated by the operation of the UAS would not be perceptible by the general public. Renovation and construction in previously disturbed base areas would result in no significant effects to physical and biological resources. One building at Holloman AFB and two buildings at Edwards AFB that would require renovation or demolition to accommodate the beddown are considered eligible for listing on the National Register of Historic Places; any disturbance to these structures would need to be coordinated through the respective State Historic Preservation Office. Short-term regional socioeconomic stimulation is anticipated from renovation and construction. Long-term personnel and population increases are anticipated from the proposed beddown, with concomitant increases in regional income, sales volumes, and taxes. There would be no disproportionate effects upon minorities or low-income populations or children.

EXECUTIVE SUMMARY
ENVIRONMENTAL ASSESSMENT
FOR THE MQ-1 PREDATOR AND MQ-9 REAPER
UNMANNED AIRCRAFT SYSTEM (UAS)
SECOND FORMAL TRAINING UNIT (FTU-2) BEDDOWN

Introduction: In accordance with the National Environmental Policy Act of 1969 (NEPA), the U.S. Air Force (Air Force), Air Combat Command (ACC), and the U.S. Army Corps of Engineers, Sacramento District have prepared this Environmental Assessment (EA) for the beddown of the Predator (MQ-1) and Reaper (MQ-9) Unmanned Aircraft System (UAS) Second Formal Training Unit (FTU) and relocation of the current FTU from Creech Air Force Base (AFB), Nevada. This EA discusses the potential environmental effects of the proposed construction and renovation of the UAS training facilities and the operation and maintenance of the MQ-1/MQ-9s.

Background/Setting: The Air Force has determined that recent events in the world have validated a requirement for a maximum surge of MQ-1 and MQ-9 UAS aircraft capability to support on-going combat operations in the Central Command (CENTCOM) Area of Operations. UAS operations provide tactical and strategic reconnaissance, as well as detection and quick destruction of targets, without needlessly jeopardizing pilots and crews. The MQ-1 and MQ-9 aircraft offer commanders and planners a low cost, lethal capability to perform a wide variety of tactical missions augmenting existing Combat Air Forces (CAF) assets. ACC, the primary force provider of combat airpower to America's war fighting commands, must proactively accommodate current demands for Combat Air Patrol (CAP) growth while enabling UAS normalization and long-term sustainment.

To fulfill the current demands for CAP growth while enabling UAS normalization and long-term sustainment, ACC needs to stand-up a second UAS FTU. The establishment of a second FTU for the MQ-1 and MQ-9 and the subsequent relocation of the current FTU at Creech AFB to the new location would help the Air Force provide trained UAS personnel to meet CENTCOM mission requirements.

Proposed Action Alternative: Under the Proposed Action, the Air Force would stand up a second FTU to another installation, in addition to the current FTU at Creech AFB, and would involve a complete beddown of the MQ-1 and MQ-9 aircraft and manned support. ACC also proposes to eventually relocate the current MQ-1/MQ-9 FTU from Creech AFB.

The preferred alternative is to beddown the units at Holloman AFB at the Option A site. The Option A site is centered on the Main Ramp and leverages existing facilities to support the beddown. Approximately 200,000 square feet of existing and unoccupied facilities including office buildings and maintenance hangars are available for use. As such, initial "flag standup" for the new FTU is supportable at any time. Many of Holloman AFB's excess ramp space, squadron operations facilities, maintenance hangars and back shops are available for immediate use and would initially support the UAS FTU beddown. However, many of these existing facilities would eventually require repair and conversion projects to bring them up to standards for long-term viability. The FTU mission would introduce a "school house" environment to the west end of the Main Ramp. A highly transient population of student pilots and sensor operators would be present on a continuous basis. The FTU mission could eventually introduce the Hellfire weapons system to the Munitions Storage Area (MSA). If the FTU Wing/Group concept is also considered, small-diameter bomb, Joint Direct Attack

Munitions (JDAM) and additional Guided Bomb Unit (GBU)-series weapons systems would also need to be supported. Additionally, a parallel taxiway would be required to reduce the amount of time required for UAS platforms to travel to access the primary surfaces. Federal Aviation Administration (FAA) policy restricts UAS operations to restricted airspace, unless an FAA-approved Certificate of Waiver or Authorization (COA) authorizes use of other airspace within the National Airspace System (NAS). Although Holloman AFB does not manage any restricted airspace, it has access to a multitude of restricted areas within White Sands Missile Range (WSMR) and Fort Bliss' McGregor Range airspace to allow UAS training. The most significant operations issues involve C-band frequency allocation. Throughout WSMR, C-band is used extensively to control missiles and record weapon telemetry. Close coordination with Holloman AFB and WSMR scheduling offices would be required to ensure no conflicts with C-band frequency use occurs. Point to Point Data Link (PPDL) is a direct Ku/Ka Line-of-Sight (LOS) capability that is coming on-line within the next 3 to 4 years and would mitigate the C-band demand issues.

Edwards AFB Alternative: The Proposed Action at Edwards AFB is to beddown the FTU at the North Base location. In addition, a school house area would be established on the Main Base, using several currently vacant buildings and proposed new buildings. Many of Edwards AFB's facilities are currently occupied or would require renovations to initially support the UAS FTU beddown. The beddown at Edwards AFB in the long-term would require substantial manpower and military construction (MILCON) funding to construct ramp space and other facilities. Existing storage space at Edwards AFB can accommodate up to 120 Hellfire missiles, in the event this ordnance is eventually introduced to the training mix. However, a new Explosive Site Plan would need to be prepared. In addition, a live ordnance loading area (LOLA) would also have to be established. Competition for Edward AFB airspace is also stringent, but flexible and dynamic scheduling should create adequate opportunities for MQ-1/MQ-9 training. MQ-1/MQ-9s would be able to depart the North Base north and eastbound for military airspace area R-2515 and for direct entry into the Four Corners training area. UAS would also utilize airspace over Fort Irwin and its desert ranges for tactical target acquisition training. Edwards AFB has significant advantages for UAS training. A portion of the existing ranges are being used today by the test community. These are large enough to permit training operations for both initial FTU stand-up and relocation of the FTU from Creech AFB. The primary concern of selecting Edwards AFB is frequency saturation. All available C-band frequencies are being used by the Edwards AFB test community. With the successful test of the C-band di-plexer at Edwards AFB, C-band frequency cards are expected to be increased by 50 percent. PPDL would mitigate the C-band demand issues within the next 3 to 4 years when it comes on-line.

Other Alternatives: A UAS FTU-2 Tiger Team with several representatives from ACC Headquarters compiled a Basing Criteria Matrix that was used to analyze candidate bases for the FTU-2 beddown. A list of six candidate bases for co-located Ground Control Stations/Launch and Recovery Elements (GCS/LRE) operations and eight candidate base combinations for split GCS/LRE operations were analyzed to determine if they met the specified criteria in the matrix. Airspace and existing base facilities were the most important criteria to facilitate a FTU stand-up in Fiscal Year (FY) 2009. Other criteria included airfield operations, weather, communications, current missions, community support and future missions. Davis-Monthan AFB/Fort Huachuca in Arizona along with Holloman AFB and Edwards AFB were the top three installations (in order of matrix score) that met the initial specified criteria in the Basing Criteria Matrix. The Commander of ACC directed a "First Look" analysis for relocating all MQ-1/MQ-9 FTU training from Creech AFB to identify the installations that could support the initial stand-up during FY 2009. For this reason, a site survey was performed at the top three

installations. The ACC Site Survey Team concluded that the beddown was feasible at Edwards AFB or Holloman AFB but Davis-Monthan AFB/Fort Huachuca would pose enormous challenges to a successful and timely MQ-1/MQ-9 FTU stand-up. The challenges included lack of a MSA, additional MILCON expenses, and the need to conduct UAS operations at a Joint-Use airfield. In particular, the lack of existing facilities for support of the FY 2009 initial beddown was of major importance. For these reasons, ACC decided not to carry Davis-Monthan AFB/Fort Huachuca forward for an environmental analysis.

Other bases that were initially considered, but did not make the short list analysis for the UAS FTU-2 beddown, were MacDill AFB/Avon Park, Florida; Hill AFB/Michael Army Airfield (AAF), Utah; Cannon AFB/Melrose, New Mexico; Barksdale AFB/Fort Polk, Louisiana; Kirtland AFB/Stallion AAF, New Mexico; Patrick AFB/Avon Park, Florida; and Luke AFB/Gila Bend, Arizona. These bases were eliminated because they did not meet the specified criteria in the Basing Criteria Matrix.

Other sites on Holloman AFB and Edwards AFB were considered but were eliminated from further consideration. At Holloman AFB, these included the North Ramp Option B and undeveloped Northwest Option C. In order to use these locations for the FTU, existing units would need to be relocated, which would require more time than is available to support the initial FY 2009 stand-up, and require a high MILCON investment; the latter would also further delay the complete beddown. The other sites considered at Edwards AFB were Main Base Option B and South Base Option C. The Main Base option is the least desired option from an operational standpoint since the UAS operations would be in the same area as the Main Base testing area and would require the need for additional ramp space to be constructed. The runway at the South Base would need extensive repair to accommodate the MQ-1/MQ-9 aircraft; therefore, substantially more time and MILCON funding would be required. Additional ramp space must also be constructed for the South Base option. The ACC Site Survey Team concluded that Options B and C at both Holloman AFB and Edwards AFB would pose an enormous challenge in a successful and timely MQ-1/MQ-9 FTU beddown and for these reasons, ACC decided not to carry these options forward for an environmental analysis.

Environmental Consequences: There would be no significant impacts on the region's water supply or water quality at either Holloman or Edwards AFB. No potentially jurisdictional wetlands occur at either proposed beddown site. There would be no significant impacts to biological resources at Holloman AFB. There would be no significant impacts to biological resources at the North Base area or Bailey Elementary School at Edwards AFB. At the schoolhouse area site, however, there could be impacts to desert tortoise (*Gopherus agassizii*), Mohave ground squirrel (*Spermophilus mohavensis*), burrowing owl (*Athene cunicularia*) and desert cymopterus (*Cymopterus deserticola*). Section 7 Consultation with the U.S. Fish and Wildlife Service would be initiated if Edwards AFB is selected. There would be no impacts to climate, geology or prime farmland at Holloman AFB or Edwards AFB. There is a potential to have some minor impacts to desert soil's crusts during UAS aircraft mishap recovery operations that require the use of wheeled vehicles, if a mishap over the desert should occur. There would be no significant impacts to safety and occupational health at either site. No significant additional demands would occur to the wastewater, electrical and gas utility infrastructure at Holloman AFB or Edwards AFB. The beddown would have negligible impacts to the water supply at Holloman AFB and the North Base area at Edwards AFB. Since the school house Area at Edwards AFB would require new construction, it is recommended that the water demands for this area be modeled to determine if any improvements to the existing water system are necessary. Transportation impacts would be minor at both Holloman and Edwards

AFB. No changes in land use are planned and the MILCON projects would be consistent with the bases' master plan. Land use would remain for military purposes on both bases.

One hangar near buildings proposed for demolition to accommodate the FTU-2 beddown at Edwards AFB is considered eligible for listing on the National Register of Historic Places (NRHP). Coordination with the California State Historic Preservation Office (SHPO) would be required to develop measures to avoid or mitigate adverse impacts for this building. Similarly, Building 301 at Holloman AFB is considered eligible for the NRHP, but some renovation to this building has been coordinated with the New Mexico SHPO.

A temporary increase in demand for public services could occur at Edwards AFB or Holloman AFB. However, no long-term adverse impacts on public services are expected. Revenue in the regions of Holloman and Edwards AFBs would increase temporarily during any period(s) of building repairs, building renovation or conversion, and the construction of the parallel taxiway. On-going air emissions from the beddown are expected to increase due to the implementation of the MQ-1 and MQ-9 training activities and the new staff and trainees; however, no significant impacts would result from the Proposed Action at either Holloman AFB or Edwards AFB. Noise emissions from training missions using the MQ-1 and MQ-9 would not create a significant impact to the existing noise environment at Holloman AFB or Edwards AFB. The beddown at Holloman or Edwards AFB would not result in a significant hazard to the public or environment regarding the transport, use, or disposal of hazardous materials or wastes. No impacts to General Aviation and other civil aircraft operating around WSMR, Holloman or McGregor Range near Holloman AFB or in the controlled airspace above and surrounding Edwards AFB would occur as a result of the Proposed Action.

Conclusion: The data presented in the EA documents that the best available site for the proposed beddown of the MQ-1/MQ-9 UAS Formal Training Units is at Holloman AFB and that the beddown at this site would result in insignificant adverse impacts on the area's human and natural environment. Therefore, no additional environmental analysis (i.e., Environmental Impact Statement) is warranted.

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SECTION 1.0
INTRODUCTION

Environmental Assessment for the MQ-1 Predator and MQ-9 Reaper Unmanned Aircraft Systems (UAS) Second Formal Training Unit (FTU-2) Beddown

1.0 Introduction

1.1 Background

The United States (U.S.) Air Force (Air Force) has determined that recent events in the world have validated a requirement for a maximum surge of MQ-1 Predator and MQ-9 Reaper Unmanned Aircraft System (UAS) aircraft capability to support on-going combat operations in the Central Command (CENTCOM) Area of Operations (AOR). UAS operations provide tactical and strategic reconnaissance, as well as detection and quick destruction of targets, without needlessly jeopardizing pilots and crews. The Predator (MQ-1) and Reaper (MQ-9) extend commanders' eyes in the battle space, while providing the ability to engage targets when appropriate. Command and control through the Air and Space Operations Center enable the multi-role UAS to rapidly transition between the intelligence collector, targeting, and shooter roles. Long loitering of the aircraft provides extended target area coverage. The MQ-1 and MQ-9 offer commanders and planners a low cost, lethal capability to perform a wide variety of tactical missions augmenting existing Combat Air Forces (CAF) assets.

The MQ-1 is a medium-altitude, long-endurance UAS. The MQ-1's primary mission is interdiction and conducting armed reconnaissance against critical, perishable targets. When the MQ-1 is not actively pursuing its primary mission, it acts as the Joint Forces Air Component Commander-owned theater asset for reconnaissance, surveillance and target acquisition in support of the Joint Forces Commander. The MQ-1 was designed in response to a Department of Defense (DoD) requirement to provide continuous intelligence, surveillance, and reconnaissance information. Current operational squadrons are the 15th and 17th Reconnaissance Squadrons (RS) at Creech Air Force Base (AFB), Nevada. The 11th RS also provides formal upgrade training at Creech AFB.

The MQ-9 is a medium-to-high altitude, long endurance UAS. The MQ-9's primary mission is as a persistent hunter-killer against emerging targets to achieve Joint Forces Commander objectives. The MQ-9's alternate mission is to act as an intelligence, surveillance and reconnaissance asset, employing sensors to provide real-time data to commanders and intelligence specialists at all levels. The Air Force proposed the MQ-9 system in response to the DoD request for Global War on Terrorism initiatives. It is larger and more powerful than the MQ-1 and is designed to go after time-sensitive targets with persistence and precision, and destroy or disable those targets. The MQ-9 is currently operated by the 42nd Attack Squadron based at Creech AFB. A schematic drawing of the MQ-1 and MQ-9 aircraft is presented as Figure 1-1.

Air Combat Command (ACC), the primary force provider of combat airpower to America's war fighting commands, must proactively accommodate current demands for Combat Air Patrol (CAP) growth while enabling UAS normalization and long-term sustainment. This effort requires the stand-up of a second UAS Formal Training Unit (FTU-2) in addition to the FTU currently operated at Creech AFB. Therefore, the Air Force proposes to beddown the MQ-1 and MQ-9 UAS FTU-2 at another installation. Eventually, the current UAS FTU at Creech AFB would be relocated to the installation that would house FTU-2.

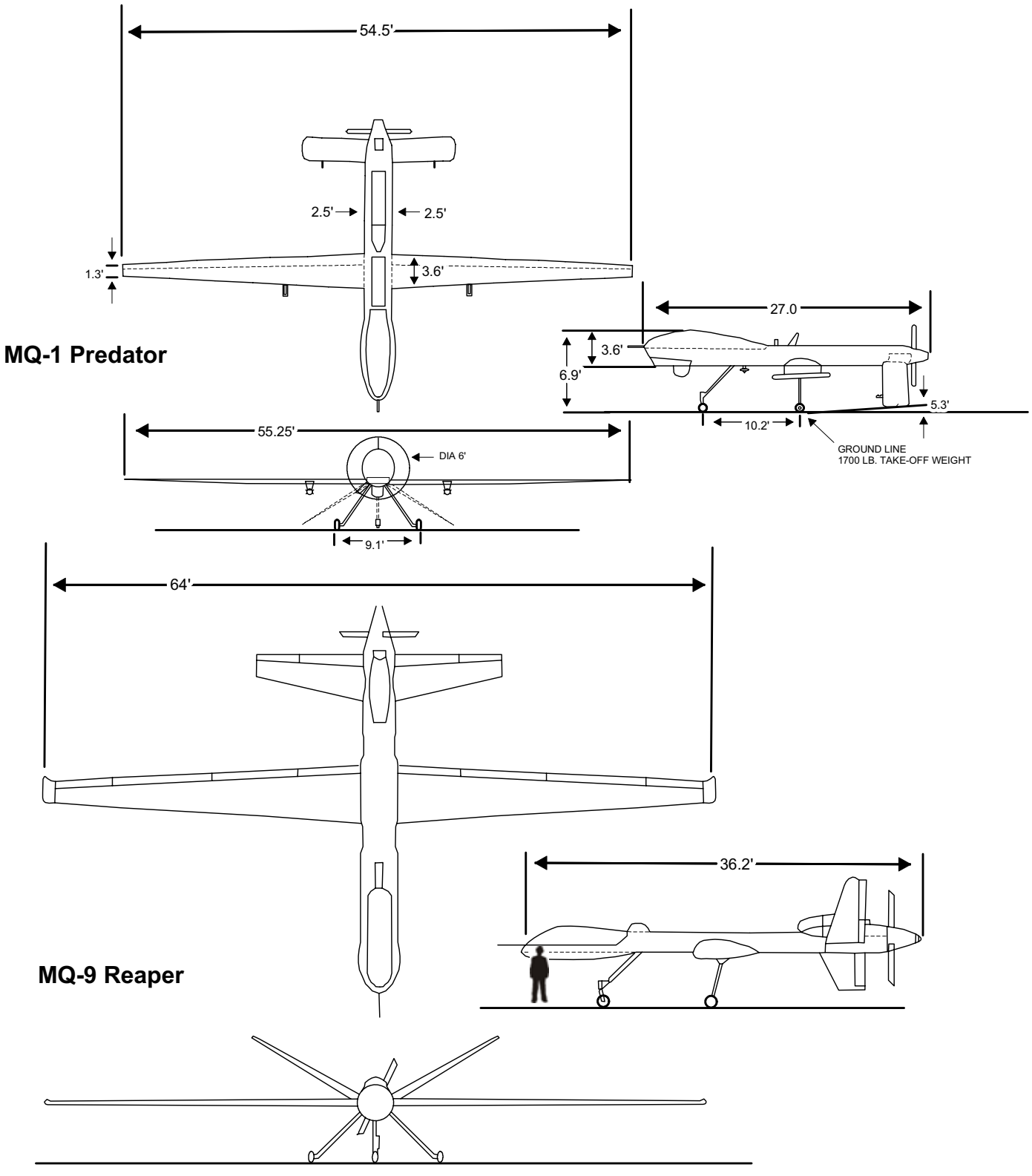

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Figure 1-1: MQ-1 Predator and MQ-9 Reaper Schematic

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After analyzing the potential environmental impacts, the Air Force would decide whether to implement the Proposed Action, or select the No Action Alternative. Approval of any alternative, except the No Action Alternative, would result in the permanent stationing of both FTUs at a single installation and the development of any infrastructure required to support this capability. This Environmental Assessment (EA) identifies the actions that are proposed relative to the environmental effects associated with the Air Force's Proposed Action. Details on the Proposed Action are presented later in Section 2.

1.2 Purpose and Need

The purpose of the Proposed Action is to provide a new location for the beddown of a second MQ-1 and MQ-9 FTU within the continental United States, which can accommodate the increased manning to support expanding mission requirements for UAS units. ACC also proposes to consolidate training assets at the new location by transferring all current UAS FTU operations out of Creech AFB due to overcrowding. This would make the operational mission footprint at Creech AFB more manageable for other CAP missions, since the restricted airspace available to Creech AFB is at maximum capacity. A Wing/Group staff would stand up to manage these training organizations. ACC plans to right-size the sustained combat operations conducted at Creech AFB to three squadrons once the training units have moved to the new location.

To fulfill the current demands for CAP growth while enabling UAS normalization and long-term sustainment, the ACC needs to stand-up the FTU-2. The establishment of the FTU-2 for the MQ-1 and MQ-9 and the subsequent relocation of the current FTU at Creech AFB to the new location would help the Air Force provide trained UAS personnel to meet CENTCOM mission requirements.

1.3 Regulatory Framework

A decision on whether to proceed with the Proposed Action rests on numerous factors, such as mission requirements, schedule, availability of funding, and environmental considerations. In addressing environmental considerations, the Air Force is guided by relevant statutes (and their implementing regulations) and Executive Orders (EO) that establish standards and provide guidance on environmental and natural resources management and planning. This includes NEPA requirements (42 United States Code [USC] 4321 et seq.), Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] 1500-1508) and Air Force Instruction (AFI) 32-7061 codified in 32 CFR 989 (The Environmental Impact Analysis Process [EIAP], 32 CFR 989). The beddown of the MQ-1 and MQ-9 UAS aircraft requires compliance with the Federal regulations and EOs presented below in Table 1-1.

Table 1-1. Summary of Relevant Regulations Including Potential Permits or Licensing Requirements

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review/Status	Status of Compliance with Relevant Laws and Regulations
FEDERAL				
General	National Environmental Policy Act of 1969 (42 USC 4321 et seq.)	Council on Environmental Quality (CEQ)	Compliance with NEPA, in accordance with CEQ regulations (40 CFR 1500-1508)	Full compliance would be achieved upon issuance of signed Finding of No Significant Impact (FONSI) (if appropriate)
	32 CFR 989 (Air Force Environmental Impact Analysis Process)	U.S. Air Force	Compliance with regulations specified in 32 CFR 989	Full compliance would be achieved upon issuance of signed FONSI (if appropriate)
Sound/ Noise	Noise Control Act of 1972 (42 USC 4901 et seq.), as amended by Quiet Communities of 1978 (P.L. 95-609)	United States Environmental Protection Agency (USEPA)	Compliance with surface carrier noise emissions	Full compliance would be achieved upon implementation of construction activities
Air	Clean Air Act and amendments of 1990 (42 USC 7401-7671q) 40 CFR 50, 52, 93.153(b)	USEPA	Compliance with National Ambient Air Quality Standards (NAAQS) and emission limits and/or reduction measures	Full compliance; emissions would be below *de minimis* thresholds
Water	Clean Water Act of 1977 (33 USC 1342) 40 CFR 122	USEPA, New Mexico Environment Department (NMED) and California Environmental Protection Agency (CalEPA)	Section 402(b) National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges for Construction Activities-Stormwater Pollution Prevention Plan (SWPPP)	SWPPP and Notice of Intent would be prepared prior to construction. Full compliance would be achieved prior to implementation of construction activities
	Executive Order 11988 (Floodplain Management), as amended by Executive Order 12608	Water Resources Council, Federal Emergency Management Agency (FEMA), CEQ	Compliance	Full compliance; No floodplains would be impacted.
	Executive Order 11990 (Protection of Wetlands), as amended by Executive Order 12608	U. S. Army Corps of Engineers (USACE) and U.S. Fish and Wildlife Service (USFWS)	Compliance	Full compliance; no jurisdiction wetlands would be impacted.

Table 1-1, continued

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review/Status	Status of Compliance with Relevant Laws and Regulations
Water, continued	Clean Water Act of 1977 (33 USC 1341 et seq.)	USACE, NMED, CalEPA	Section 401/404 Permit	Full compliance; no jurisdictional waters are located on any of the proposed sites at Holloman AFB or Edwards AFB
	Coastal Zone Management Act of 1972 (16 USC 1456[c]) Section 307	National Oceanic and Atmospheric Administration (NOAA)	Compliance	Neither Holloman AFB or Edwards AFB is within the coastal zone
Soils	Resource Conservation and Recovery Act of 1976 (42 USC 6901-6992k), as amended by Hazardous and Solid Waste Amendments of 1984 (P.L. 98-616; 98 Stat. 3221)	USEPA	Proper management, and in some cases, permit for remediation	Full compliance would be achieved prior to implementation of construction activities
	Comprehensive, Environmental Response, Compensation, Liability Act of 1980 (42 USC 9601-9675), as amended by Emergency Planning and Community Right-To-Know-Act of 1986 (42 USC 11001 et seq.) Release or threatened release of a hazardous substance	USEPA	Development of emergency response plans, notification, and cleanup	Full compliance
	Farmland Protection Policy Act of 1981 (7 USC 4201 et seq.) 7 CFR 657-658 Prime and unique farmlands	Natural Resource Conservation Service (NRCS)	NRCS determination via Form AD-1006	Full compliance since no prime farmlands are located in New Mexico or at the sites on Edwards AFB
Natural Resources	Endangered Species Act of 1973, as amended (16 USC 1531-1544)	USFWS	Compliance by lead agency and/or consultation to assess impacts and, if necessary, develop mitigation measures	Full compliance since no protected species would be impacted.
	Migratory Bird Treaty Act of 1918	USFWS	Compliance by lead agency and/or consultation to assess impacts and, if necessary, develop mitigation measures	Full compliance would be achieved upon implementation of construction activities. If initial grubbing and clearing can not avoid nesting season, breeding pairs and nests would be identified and avoided to the extent practicable

Table 1-1, continued

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review/Status	Status of Compliance with Relevant Laws and Regulations
Natural Resources, continued	Bald and Golden Eagle Act of 1940, as amended	USFWS	Compliance by lead agency and/or consultation to assess impacts and, if necessary, obtain permit	No effects on bald or golden eagles; full compliance
Health and Safety	Occupational Safety and Health Act of 1970	Occupational Safety and Health Administration (OSHA)	Compliance with guidelines including Material Safety Data Sheets	Full compliance would be achieved upon implementation of construction activities
Cultural/ Archaeo-logical	National Historic Preservation Act of 1966	Advisory Council on Historic Preservation through State Historic Preservation Officer (SHPO)	Section 106 Consultation	Full compliance would be achieved prior to implementation of any construction activities; coordination is on-going.
	Archaeological Resources Protection Act of 1979	Affected land-managing agency	Permits to survey and excavate/remove archaeological resources on Federal lands; Native American tribes with interests in resources must be consulted prior to issue of permits.	Full compliance
	American Indian Religious Freedom Act of 1978, as amended		Compliance	Full compliance
	Native American Graves Protection and Repatriation Act of 1990	National Park Servicev(NPS)	Compliance	Full compliance
	EO 13175 (*Consultation and Coordination with Indian Tribal Governments*)	Bureau of Indian Affairs (BIA)	Coordinate directly with tribes claiming cultural affinity to project areas	Full compliance
Social/ Economic	EO 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) of 1994	USEPA	Compliance	Full compliance since no minority or low income populations would be affected
	EO 13045 (*Protection of Children from Environmental Health Risks and Safety Risks*)	USEPA	Compliance	Full compliance since no children would be exposed to the construction activities

Table 1-1, continued

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review/Status	Status of Compliance with Relevant Laws and Regulations
Social/ Economic, continued	EO 13101 (*Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition*)	USEPA	Compliance	Full compliance
	EO 13123 (*Greening the Government Through Efficient Energy Management*)	USEPA	Compliance	Full compliance
	EO 13148 (*Greening the Government Through Leadership in Environmental Management*)	USEPA	Compliance	Full compliance
Airspace	AFS-400 UAS Policy 05-01 (*Unmanned Aircraft Systems Operations in the U.S. National Airspace System-Interim Operational Approval Guidance)*	Federal Aviation Administration, Department of DoD	Certificate of Waiver Authorization (COA)	Full compliance

These authorities are addressed in various sections throughout this EA when relevant to particular environmental resources and conditions.

1.4 Public Involvement

The Air Force invites public participation in the NEPA process. Consideration of the views and information of all interested persons promotes open communication and enables better decision-making. The Air Force set forth the Interagency/Intergovernmental Coordination for Environmental Planning (IICEP) as a scoping process which informs local, state, tribal and Federal agencies of proposed projects. All agencies, organizations, and members of the public having a potential interest in the Proposed Action, including minority, low-income, disadvantaged, and Native American groups, are urged to participate in the decision-making process.

Public participation opportunities with respect to the EA and decision-making on the Proposed Action are guided by 32 CFR Part 989. The EA and draft Finding of No Significant Impact (FONSI) were made available to the public for 30 days beginning on 15 March 2009. Notices of Availability (NOA) were published in local and regional newspapers near both Holloman and Edwards AFBs. Proof of publication of the NOAs is contained in Appendix D. Copies of the EA and draft FONSI were made available at public libraries and on USAF public website. As appropriate, the Air Force may execute the FONSI and proceed with implementation of the Proposed Action.

Throughout this process, the public may obtain information on the status and progress of the Proposed Action and the EA through the United States Air Force, Headquarters ACC by contacting Mr. Don Calder, ACC/A7PP, 129 Andrews Street, Suite 102, Langley AFB, Virginia 23665-2769 or by telephone at (757) 764-6156 or through the United States Army Corps of

Engineers, Sacramento District by contacting Mr. Josh Garcia, 1325 J Street (CESPK-PD-R), Sacramento, California, 95814-2922 or by telephone at (916) 557-6778.

SECTION 2.0
DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.0 Description of Proposed Action and Alternatives

This chapter describes the Proposed Action and alternatives for the beddown of the MQ-1 and MQ-9 aircraft and staff. The Proposed Action will involve the Preferred Alternative which is Option A at Holloman AFB and is described in Section 2.2, and Alternative #1 which is at Edwards AFB and is described in Section 2.3. The No Action Alternative is described in Section 2.4 Section 2.5 discusses other alternatives eliminated, including other bases and other sites at Holloman AFB and Edwards AFB that were considered. A comparative summary of impacts is provided in Section 2.6.

The Program Decision Memorandum (PDM) II signed by the Deputy Secretary of Defense on November 19, 2007 provides the Air Force with resources including procurement, operations and maintenance (O&M), manpower and military construction (MILCON) to standup an additional UAS FTU beginning in Fiscal Year (FY) 2009. An ACC Site Survey team compiled a UAS FTU-2 Basing Criteria Matrix to analyze a list of six bases for collocated Ground Control Stations (GCS)/Launch and Recover (LRE) Operations, as well as eight candidate base combinations for split GCS/LRE Operations that met the specified criteria in the matrix. Airspace and existing base facilities were the most important criteria to facilitate an FTU start-up in FY 2009. Other issues considered include airfield operations, weather, communications, current mission, community support, and future missions. The top three bases meeting the criteria, in order of matrix score, were Holloman AFB, New Mexico; Edwards AFB, California; and Davis-Monthan AFB/Fort Huachuca, Arizona. Site surveys were then conducted by the Site Survey Team at Holloman AFB, Edwards AFB, and Davis-Monthan AFB/Fort Huachuca. The Site Survey Team concluded that the UAS FTU-2 beddown is feasible at Edwards AFB or Holloman AFB (Figure 2-1) and these two locations will be carried forward for analysis in the EA. The reasons Davis-Monthan AFB/Fort Huachuca was eliminated are discussed later in Section 2.5.

2.1 Proposed Action

Under the Proposed Action, the Air Force would stand up a second FTU of MQ-1 and MQ-9 aircraft at another installation, in addition to the existing FTU at Creech AFB, and would involve a complete beddown of these aircraft and manned support. ACC also proposes to eventually relocate the current MQ-1/MQ-9 FTU from Creech AFB to the same installation as the FTU-2 (see Figure 2-1).

The new FTU Wing/Group would eventually bring in a total of five MQ-1/MQ-9 FTU squadrons: three FTU squadrons, one training squadron and one Maintenance squadron. This is in addition to the MQ-1 and MQ-9 squadrons that would be relocated from Creech AFB. The FTU-2 beddown would bring in approximately 750 to 800 personnel that include 600 permanent party personnel and 200 students; of this, 200 personnel would be those staff relocated from Creech AFB and consist of 100 officers and 100 enlisted personnel. The ultimate permanent party personnel would consist of 200 officers, 250 enlisted personnel and 150 contractors. The 200 students would cycle through in 3 month periods. The force structure would consist of 38 aircraft comprised of 28 MQ-1s and 10 MQ-9s . Of the 28 MQ-9s, 16 would be relocated from Creech AFB. There would be 12 Ground Control Stations (GCS) and up to two Primary Predator Satellite Links (PPSL). Eventually, at any given time, there would be three squadrons of personnel flying and one squadron in the classroom training. There would be approximately 2,880 sorties per year (or about 8 per day) based on three flying squadrons, of which

Figure 2-1: Project Location Map

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approximately 480 sorties would be conducted at night. This is based on a week of night training (M-F) held every 6 weeks. The day training schedule would be from 0700 to 2200 hours, while the night training would be held from 2200 to 0700 hours.

There are two types of munitions that would typically be used: Guided Bomb Unit-12 (GBU) and GBU-38 laser guided bombs. Typical operating altitudes of the aircraft would be 5,000 to 25,000 feet above ground level (AGL) for the MQ-1 and 15,000 to 35,000 feet AGL for the MQ-9. There is a possibility that air to ground missile (AGM) Hellfire laser guided missiles (AGM-114) would be introduced at a later date, but currently the impact areas available for UAS training are not authorized for Hellfire missiles. Currently, the only areas large enough to accommodate the Hellfire missile are the WSMR weapons impact test (WIT) areas. If these weapons systems are needed at some time in the future, a supplemental NEPA document might be required and coordination with WSMR would be completed to ensure approval. Inert Hellfire missiles could be carried by UAS aircraft for training purposes, but they are not currently planned to be fired at either installation.

2.2 Preferred Alternative

The Preferred Alternative is to beddown the units at Holloman AFB at the Option A site. The Option A site is centered on the Main Ramp and leverages existing facilities to support the beddown. Approximately 200,000 square feet of existing and unoccupied facilities including office buildings and maintenance hangars are available for use. As such, initial "flag standup" for FTU-2 is supportable at any time. The Option A site is recommended as the most desirable location (Figure 2-2). The other two optional sites are discussed later under alternatives eliminated.

2.2.1 Facilities

Holloman AFB has excess ramp space and a number of unoccupied buildings and maintenance hangars that can be immediately utilized to initially support the UAS FTU-2 beddown. These are existing, unoccupied buildings available for immediate use, which would satisfy the criterion of supporting the initial stand-up in FY 2009. However, many of these existing facilities would eventually require repair and conversion projects to bring them up to standards for long-term viability.

The two areas that would be impacted by the Option A beddown include the Main Ramp cantonment area and the Munitions Storage Area (MSA). The FTU mission would introduce a "school house" environment to the west end of the Main Ramp. This school house environment was previously present for the F-4 (20^{th} FS) training mission at the same location. A highly transient population of student pilots and sensor operators would be present on a continuous basis. The population would change out once every quarter with a 1 to 2 week overlap on each end. The reintroduction of students will place lightly used parking areas, recreational facilities and underused lodging back to capacity. Added demand for temporary quarters, base exchange, commissary and other community-related functions would need to be met. Privately owned vehicle (POV) traffic would increase in this area of the main base due to permanent staff assigned to FTU-2. POV traffic due to the student population is deemed highly variable.

The MSA capacity related to both maintenance activities and storage is at a maximum due to the on-going F-22A beddown. If the FTU Wing/Group concept is also considered, small-diameter bomb, Joint Direct Attack Munitions (JDAM) and additional GBU-series weapons systems would also need to be supported. Any future munitions for the MQ-1/MQ-9 (e.g., Hellfire) would be accommodated at the existing munitions storage facility. Therefore,

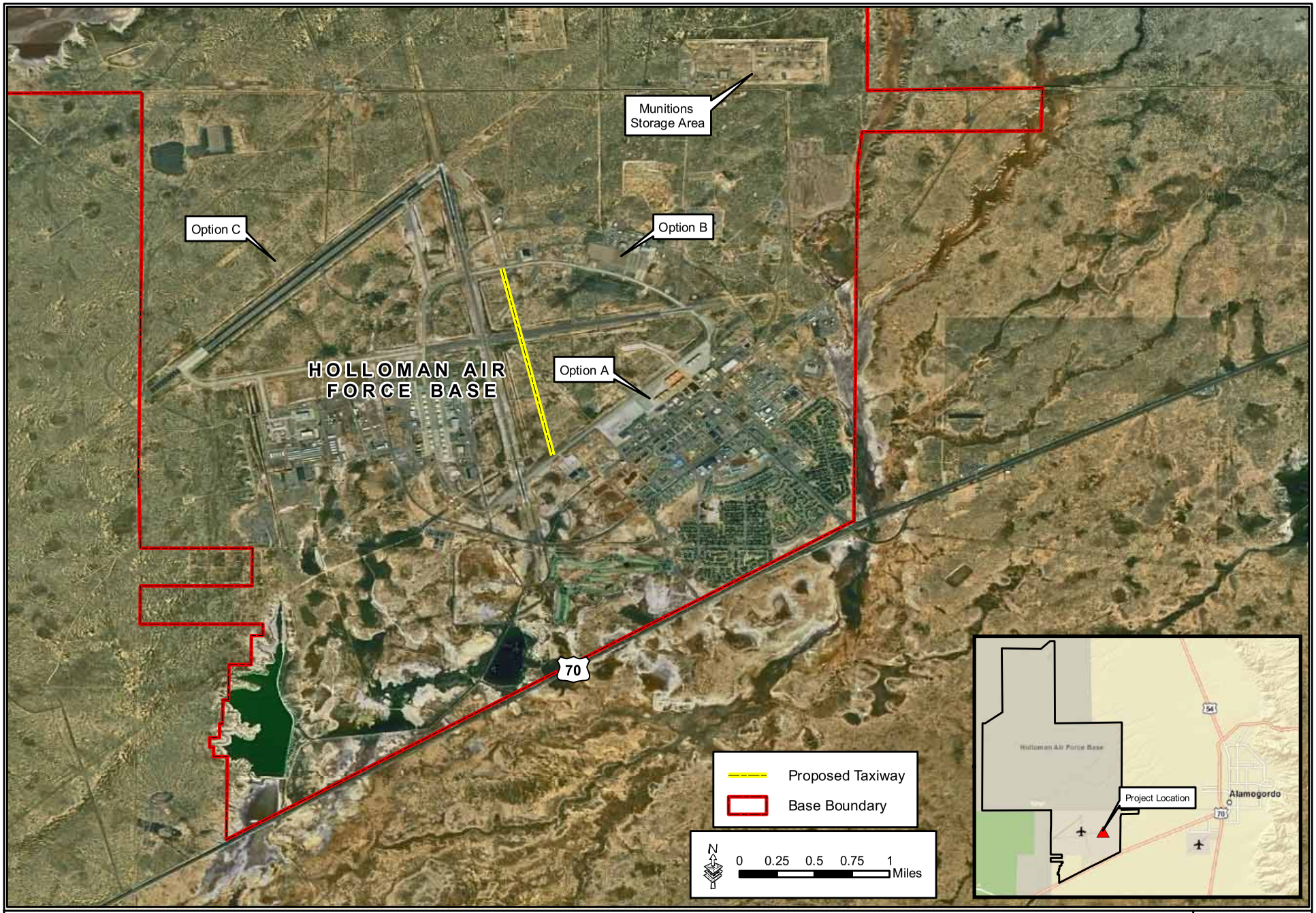

Figure 2-2: Holloman Air Force Base Beddown Options

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maintenance and storage capacity would need to be increased. Road work would also be required along the haul route inside the MSA. Existing asphalt roads have failed and are required to be upgraded to support the new munitions requirements. A new live ordnance loading area (LOLA) would be required to support live drops on Red Rio Range. Additionally, a taxiway on the east side, and parallel to Runway 16/34, would be required to reduce the amount of taxi time required for UAS platforms to access the primary runways (see Figure 2-2). Table 2-1 describes the facility plan based on executing Option A, and Figure 2-3 depicts the location of these facilities.

Table 2-1. Facility Plan

Functional Description	Remarks
Flightline Pavement	Use Main Ramp
LOLA	Construct new LOLA on taxiway Echo
Maintenance Hangar	Use Building 500
Maintenance Hangar	Use Building 301
FTU Squadron Operations (New FTU)	For initial capability, use Building 513 and a portion of Building 302; when project is complete, transition from Building 513 into Building 318
FTU Squadron Operations (Creech UAS)	If there are 2 FTU squadrons, use Building 318; a third FTU squadron can occupy all of Building 302 after F-22A transition is complete
Aircraft Maintenance Squadron (AMXS)	Initially locate leadership team in Building 303 and operate Flightline crews out of Building 301 until completion of Building 500 new construction (10,000 sf)
AMXS	If two units, locate both leadership teams in Building 303 and flightline crews of the 2nd unit in Building 301. If three units, locate third leadership team in Building 302; locate flightline crew of 3rd unit in Building 302. New construction for Building 301 can also be considered for crew #3
FTU school house (3 FTU Squadrons)	Use Building 513; develop as a full training squadron unit when two FTUs are present
Fuel System Maintenance	Use Building 315
Precision Guided Munitions (PGM) Storage Facility	Construct 2 maintenance bay and admin
Munitions Storage	Construct 26’ x 120’ Hayman igloo (possibly two 60’ sections)
Aircraft Parts Store	Use existing contract support or shared Building 292 (T-38 Parts store)
Aircraft Parts Store	If T-38 mission relocates, use Building 292. If no relocation, add space to B292
Weapons Release Shop	Use each respective maintenance bay (Building 500 for 1 and Building 302 for 2)
Casket Storage	Construct 50’ x 80’ covered storage pad in Logistics Readiness Squadron (LRS) yard. Requirement may grow dependent on quantity of MQ-9 caskets on hand
Bulk Fuel Storage	Construct two 8,000 gallon tanks adjacent to Hangars 301 and 500 (for AvGas) for MQ-1 and use existing JP-8 capacity for MQ-9. Bays one/two of Hangar 868 could also be used as the primary fuel facility for the F-22 and UAV.
Various back shops	Construct 5,000 square feet addition on Building 500. Building 301 may require new additional space

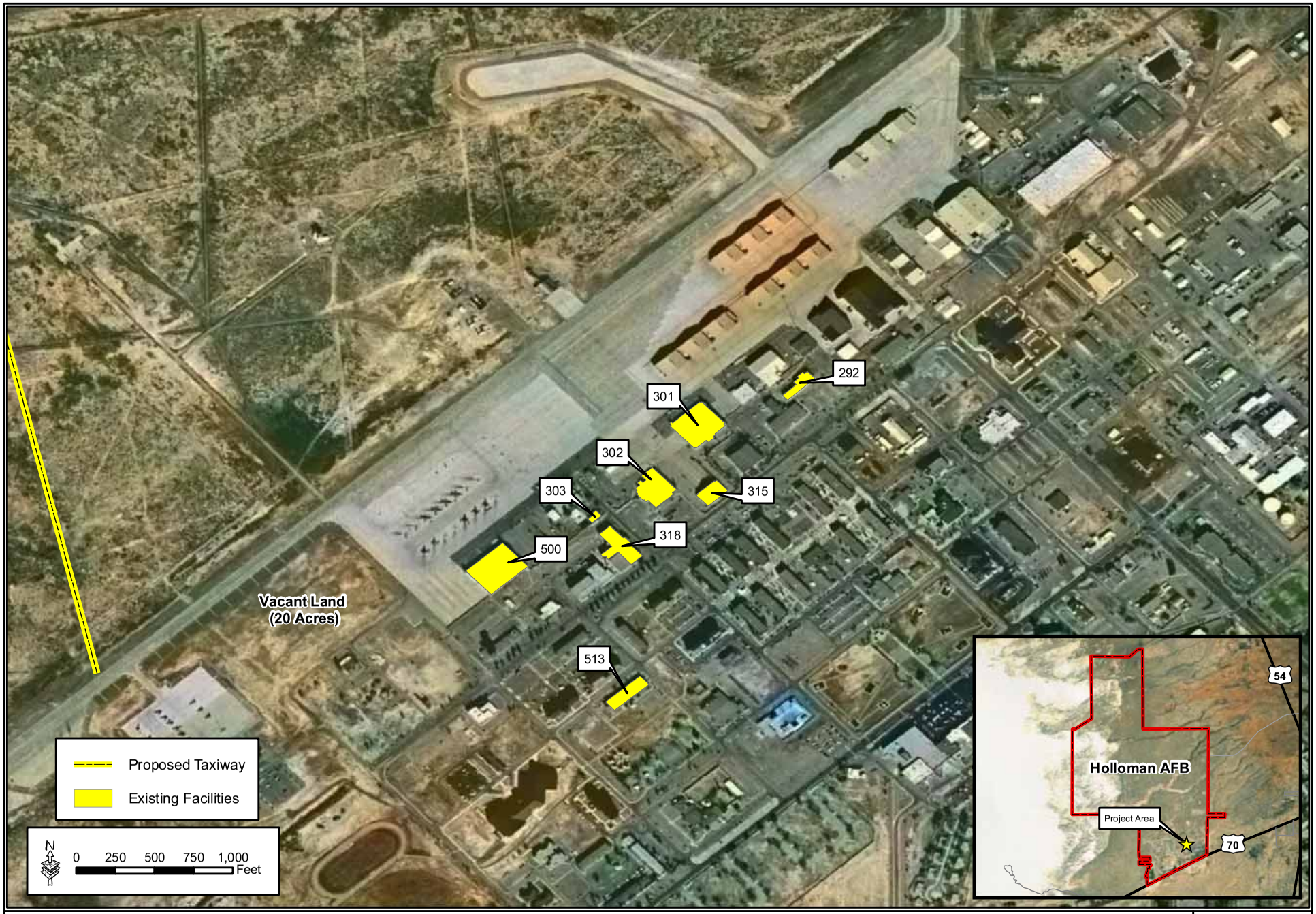

Figure 2-3: Existing Facilities at Holloman Air Force Base

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In some cases, facilities and/or infrastructure are either not available or non- existent for specialized functional requirements. In those cases, new construction (MILCON) would satisfy the shortfall. Table 2-2 details the MILCON projects.

Table 2-2. Facility Description

Project Description	Scope
MILCON Projects	
Planning and Design	Lump Sum (LS)
Building 500, Maintenance Hangar & AMXS	54,000 square feet (sf) of existing and 15,000 sf of new
Building 318, FTU Squadron Operations	51,175 square feet existing and 10,000 sf pad
Construct Hellfire PGM Facility	2,250 sf
Construct Hayman Storage Igloo	3,120 sf
Construct Live Ordnance Load Area	30,000 square yards (sy)
Construct Parallel Taxiway, Taxiway Delta	45,0000 sy
O & M Projects	
A-E Design	LS
Repair Access Road, MSA	LS
Construct Parking, MSA	20 stalls
Repair Inspection Bay, Building 1222	1,500 sf
Install Fire Suppression, Building 315	LS
Construct Casket Storage, LRS yard	4,000 sf
Allied Support, Aircraft Sunshades	6 each
Repair FTU school house, Building 513	20,000 sf
Repair Visitors' Quarters for Pipeline Students	LS

2.2.2 Airspace

Federal Aviation Administration (FAA) policy restricts UAS operations to restricted airspace, unless an FAA-approved Certificate of Waiver or Authorization (COA) authorizes use of other airspace within the National Airspace System (NAS). The COA would describe the aircraft tasks, operations, ground station and telemetry system. Although Holloman AFB does not manage any restricted airspace, it has access to a multitude of restricted areas within White Sands Missile Range (WSMR) and Fort Bliss' McGregor Range airspace, and numerous Military Operations Areas (MOA) and Air Traffic Controlled Assigned Airspace (ATCAA) throughout the area that could be utilized for UAS training with appropriate COAs.

Competition for WSMR airspace is stringent, but flexible and dynamic scheduling should create ample opportunities for MQ-1/MQ-9 training. The 49 OSS/OSOS (Holloman AFB Scheduling Office), 46th Test Group Detachment 1 (which is the Air Force liaison with WSMR), and the WSMR Scheduling Office have the responsibility to coordinate and cooperate to ensure that UAS training operations are conducted in concert with other Air Force, WSMR, and WSMR tenants' missions. While COAs are not needed to access WSMR restricted airspace, the Holloman AFB Airspace Management office is currently developing COAs that will allow access to Class D and ATCAA airspace outside the boundaries of WSMR and Ft. Bliss restricted airspace. MQ-1/MQ-9s would be able to depart Holloman AFB north, west or southbound, directly access WSMR airspace and accomplish training without leaving the confines of R-5107 (R-5107) B/C/D/E/H/J, R-5109 A/B and/or R-5111 A/B/C. Provided a COA can be approved that would allow transit between R-5107 A/B/D and R-5103 B/C, through the Valmont ATCAA, R-5103 B/C could be utilized for UAS training. This would include the use of Holloman-operated Centennial Range that is within R-5103C. Provided suitable COAs could be established/approved to utilize the Beak A/B/C MOA/ATCAAs, Cowboy A/B/C ATCAAs, and

Talon High East/West MOA/ATCAAs, Bronco MOA/ATCAAs, Pecos MOA/ATCAAs, Ancho A/B/C, Melrose, Capitan and Sumner ATCAAs and as yet unnamed ATCAA bridges to provide access to those ATCAAs, those areas could also be utilized for UAS training. The Stallion, Oscura and Condron airfields would provide UAS FTU with an auxiliary field for additional pattern work with Oscura being the optimal choice due to its location near the eastern boundary of R-5107B and Condron being the least desirable. Oscura airfield is currently closed and would require repairs to the runway surface prior to reopening. The Red Rio Range at WSMR would be utilized for bombing with live ordnance. The airspace surrounding Holloman AFB is illustrated on Figure 2-4.

2.2.3 Current Operations

Holloman AFB has access to a generous amount of DoD managed airspace to conduct UAS training activities and provides excellent airspace and ranges. Other than scheduling and C-band issues, Holloman AFB has none of the problems associated with UAS flight training that normally stem from a lack of airspace access. The most noteworthy operations issues involve C-band frequency allocation. Throughout WSMR, C-band is used extensively by tracking radars to record weapon telemetry. The spectrum could be saturated if UAS operations are added without proper coordination and planning. However, with close coordination among all users, C-band would be available until the primary means to control UAS shifts to Ku band. Point to Point Data Link (PPDL) is a direct Ku/Ka Line-of-Sight (LOS) capability that is coming on line within the next 3 to 4 years and would mitigate the C-band demand issues.

2.2.4 Current Flying Training/Sorties Requirements/Airspace Utilization

The following table shows the current annual airfield operations and training sorties occurring in the DoD managed airspace near Holloman AFB:

Table 2-3. Annual Airfield/Terminal Airspace Operations

Aircraft Type	Arrivals Day	Arrivals Night	Departures Day	Departures Night	Multiple Patterns Day	Multiple Patterns Night	Total Day	Total Night	Total Airfield/ Terminal Ops
T-38A	261	0	261	0	1,044	0	1,566	0	1,566
Tornado	6,537	239	6,537	239	30,262	638	43,336	1,116	44,452
QF-4	400	0	400	0	800	0	1,600	0	1,600
F-22A	8,316	324	8,640	0	16,632	0	33,588	324	33,912
Other	2,076	389	2,076	389	0	0	4,152	778	4,930
Total	17,590	952	17,914	628	48,738	638	84,242	2,218	86,460

An airfield operation represents the single movement or individual portion of a flight in the base airfield airspace environment, such as one landing, one takeoff or one transit of the airport traffic area. A sortie consists of a single military aircraft from takeoff through landing. A single sortie generates at least two airfield operations (takeoff and landing). Each multiple pattern at the airport consists of two operations: a touch down immediately followed by a takeoff. These are additional to the initial takeoff and final landing of each sortie at the airfield. A day sortie is from 0700 to 2200 local time and a night sortie is from 2200 to 0700 local time. The UAS sorties are defined in the same manner; however the UAS flight time duration is approximately 10 hours. Table 2-4 shows annual sortie operations in the training airspace for Holloman AFB; the current expectation for the MQ-1/MQ-9 operations would be 100 percent of take-off and landings within restricted airspace and up to 80 percent of the flight within ATCAA at altitudes above 18,000 feet MSL. No operations are currently anticipated for MOAs.

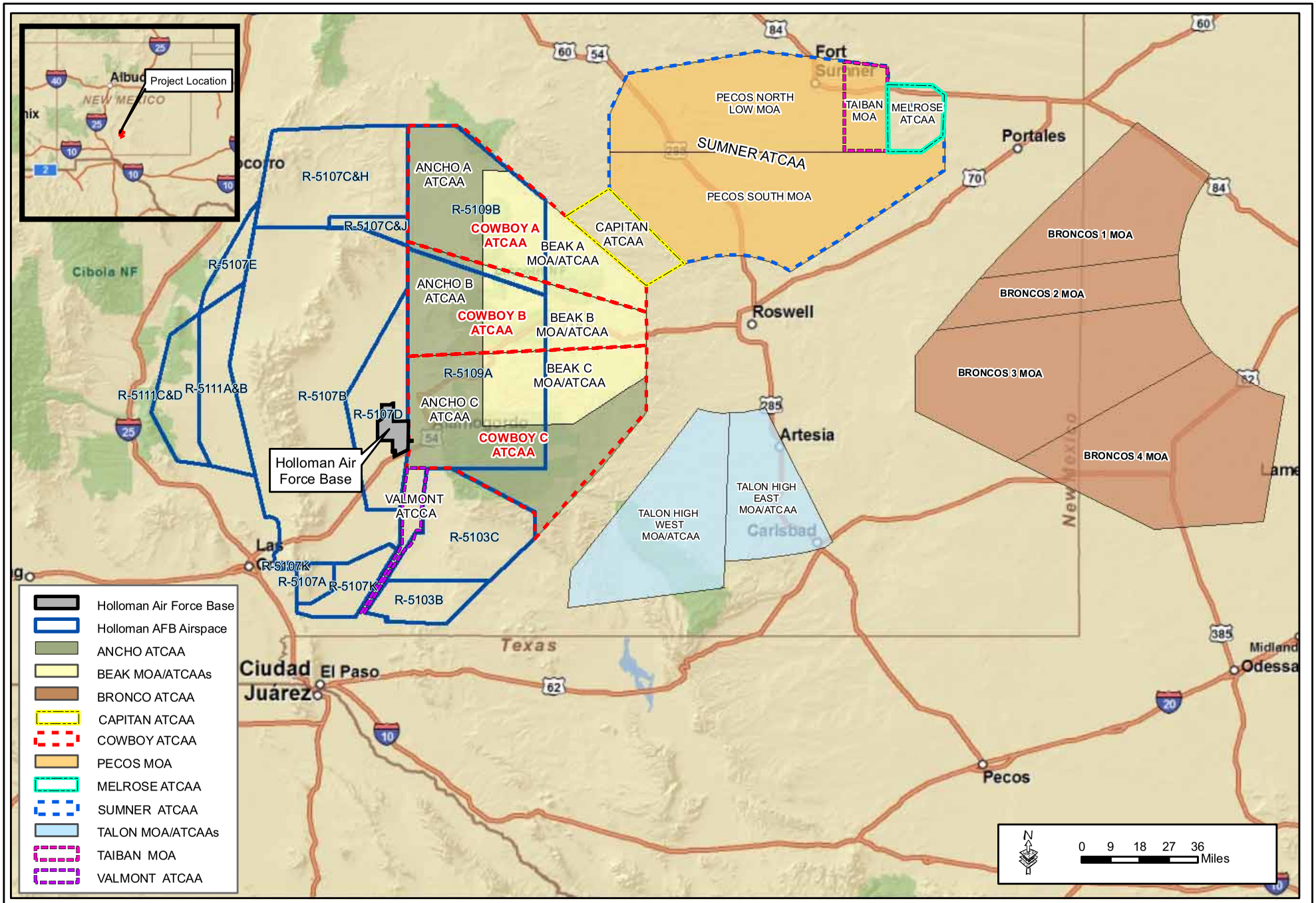

Figure 2-4: Airspace in the General Area of Holloman Air Force Base

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Table 2-4. Current Annual Sortie Operations in Training Airspace

Airspace Unit	Floor (feet)	Ceiling (feet)	F-22/Tornado/Other
Beak MOA/ATCAA/A/B/C	12,500 AGL	FL230	4,986
Cowboy ATCAA A/B/C	FL230	FL600	4,399
Talon High East/High West MOA/ATCAA	12,500 MSL	FL600	1,550
Valmont ATCAA	FL180	FL600	4,500
R-5107 Red Rio Range	Surface	FL300	1,327
R-5107 Oscura Range	Surface	FL400	1,592
R-5107 Lava E/W	500 AGL	FL600	7,550
R-5107 Mesa E/W	500 AGL	FL600	7,485
R-5107 Yonder	500 AGL	FL600	6,929
Yonder South	500 AGL	FL600	6,929
Yonder East	FL180	FL600	6,929
R-5103 McGregor	500 AGL	FL600	880
R-5103 Centennial Range	Surface	Unlimited	913
R-5111A	13,000 MSL	Unlimited	6,929
R-5111B	Surface	13,000 MSL	95
R-5111C	13,000 MSL	Unlimited	54
R-5111D	Surface	13,000 MSL	39

AGL=Above Ground Level, FL=Flight Level, MSL=Mean Sea Level

2.2.5 Munitions

The munitions proposed for use during training missions include GBU-12 laser guided bombs. The MQ-9 could eventually carry GBU-38 500-pound JDAM and 250-lb small diameter bombs. Table 2-5 describes the munitions currently used by aircraft initiating missions from Holloman AFB, as well as the various bombing ranges used. Live JDAM ordnance is anticipated for delivery only in the Red Rio Range. The Centennial Range and Red Rio Range would be used equally for delivery of inert JDAM and GBU-12 ordnance. Inert Hellfire missiles could be carried by UAS for flight training purposes; however, these missiles would not be fired under the current operational plans.

Table 2-5. Current Munitions Usage

Type	Other/F-22	Location
Ammo	34,000	Yonder air-to-air firing area
Bombs	41,000/300	Red Rio Range, Oscura Range, McGregor Range, Melrose Range*
Rockets	350/0	Red Rio Range, Oscura Range, Centennial Range

* located in west central New Mexico, but not anticipated to be used by MQ-1/MQ-9

2.2.6 Communication

All facilities would receive communications and information service through the 49th Communication Squadron (49 CS) as defined in host-tenant support agreements. Telephone, network and special circuit requirements must be identified through the submission of a Process, Workflow, Requirements and Resource (PWRR) request. The ACC would submit requirements for all known communications needs as soon as possible. This would allow the communication squadron enough time to develop the technical solutions and actual costs for requirements. Base personnel would increase with the beddown. The 49 CS must coordinate with the wing's manpower office to determine if sufficient justification exists within the

communications squadron to gain a Base Operations Support (BOS) adjustment to their Unit Manning Document (UMD).

2.3 Edwards AFB Alternative

The Proposed Action at Edwards AFB is to beddown the FTU-2 at the North Base location. In addition, a school house area would be established on the Main Base, using several currently vacant buildings. Beddown at Edwards AFB would require substantial MILCON funding to construct ramp space and other facilities, as described below.

2.3.1 Facilities

Many of Edwards AFB's facilities are currently occupied or would require renovations to initially support the UAS FTU-2 beddown. The two areas that would be impacted by the beddown at Edwards AFB are the school house area and the North Base Area (Figure 2-5). The FTU mission would introduce a "school house" environment within the cantonment area of the Main Base. A highly transient population of student pilots and sensor operators would be present on a continuous basis. As discussed for Holloman AFB, the population would change out once every quarter with a 1 to 2 week overlap on each end, which would increase demand for temporary quarters, base exchange, commissary and other community-related functions met. POV traffic would increase in this area as well as in the North Base due to permanent staff assigned to FTU-2. Table 2-6 identifies the MILCON projects that would be required to accommodate the initial stand-up of FTU-2 and the ultimate relocation of the current FTU from Creech AFB.

Table 2-6. MILCON Requirements for FTU Beddown

Function / Activity	Required Space Initial Startup	Required Space Final Beddown
Parking Apron	30,000 square feet (SF)	60,000 SF
Squadron Operations Facility	16,000 SF	48,000 SF
FTU school house (classrooms and simulators)	20,000 SF	50,000 SF
GCS Facility	11,00 SF	11,00 SF
Aircraft Maintenance Unit	12,000 SF	24,000 SF
Maintenance Hangar	30,000 SF	70,000 SF
Munitions PGM Shop	2,250 SF	unknown
Munitions Storage	3,120 SF	unknown
Aircraft Parts Store	10,000 SF	10,000 SF
Weapons Load Trainer	1 Bay	1 Bay (use maintenance bay)
Casket Storage	8,000 SF	16,000 SF
Bulk Fuel Storage	(2) 16,000 gal tanks for AvGas	(2) 16,000 gal tanks for AvGas
Lodging	60 rooms	200 rooms
AME Storage & Build-up	Not required	Not required
Battery Shop	Not required	Not required
Armament Shop	24,000 SF for all backshop	24,000 SF for all backshop
Engine Shop	24,000 SF for all backshop	24,000 SF for all backshop
AGE Maintenance Shop	24,000 SF for all backshop	24,000 SF for all backshop
Wheel & Tire Shop	24,000 SF for all backshop	24,000 SF for all backshop
NDI Shop	24,000 SF for all backshop	24,000 SF for all backshop
Structures Shop	24,000 SF for all backshop	24,000 SF for all backshop
Composites Shop	24,000 SF for all backshop	24,000 SF for all backshop
Avionics Shop	24,000 SF for all backshop	24,000 SF for all backshop
E & E	24,000 SF for all backshop	24,000 SF for all backshop

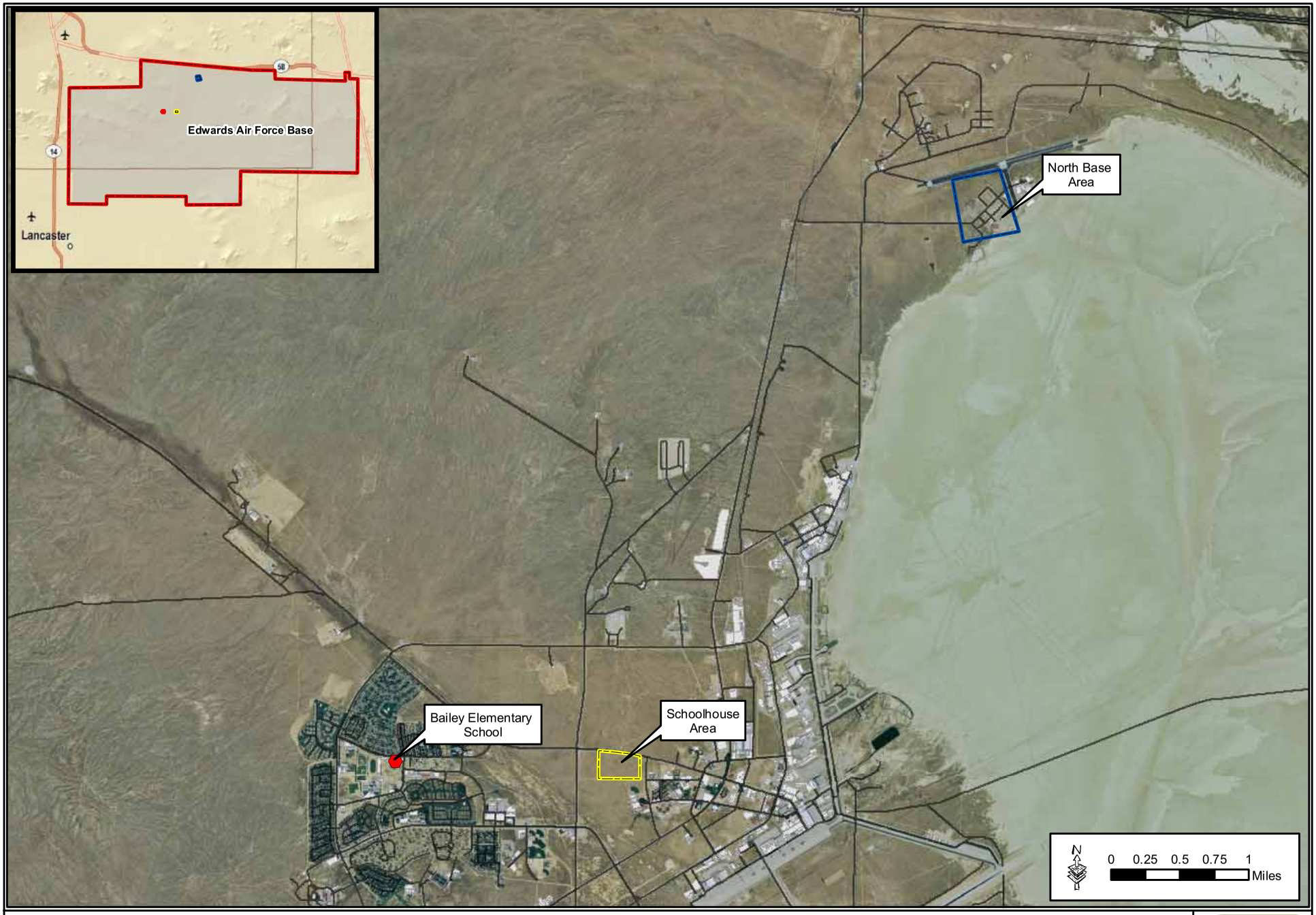

Figure 2-5: Edwards Air Force Base North Base and Schoolhouse Areas

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During the initial stand-up of FTU-2, some existing facilities could be used with minor renovations including Building 4231 (20,000 SF), which is presently the Security Forces Squadron (SFS); Building 4230 (1900 SF), which is presently the SFS armory; and Building 4287 (11,000 SF), which is presently a maintenance facility. Several dorms on the base will soon be excessed and could be used to house students and trainers. However, there may be issues about having officers on temporary duty (TDY) in the same dorms as enlisted personnel and this would have to follow regulatory standards. Consequently, base lodging could be used for officers until separate housing could be identified or constructed.

Classroom space during the initial stand-up would be provided by leasing the Bailey Elementary School from the Muroc Joint Unified School District in Kern County. Bailey Elementary School is located on-base (see Figure 2-5) but is owned and operated by Muroc Joint Unified School District in Kern County. The school was closed at the end of the 2006-2007 school year. A fence would be required around the facility, as well as some minor modifications, such as installing temporary closures over the windows for security. Additionally, the multi-use building may be able to house the simulator and the GCS as long as there is ample space and the Muroc Joint Unified School District would allow the Air Force to install a door large enough to install the units. If the Muroc Joint Unified School District is not willing to lease Bailey Elementary School, temporary facilities (modular units) would be used.

2.3.2 Airspace

Competition for Edwards AFB airspace is also stringent, but flexible and dynamic scheduling should create adequate opportunities for MQ-1/MQ-9 training. Airspace surrounding Edwards AFB is depicted in Figure 2-6. MQ-1/MQ-9s would be able to depart the North Base north and eastbound for military airspace area R-2515 and for direct entry into the Four Corners training area. Adjacent to the west are the F-22 E/W training areas with the precision impact range. All are within 20 nautical miles of the Edwards AFB runways. If scheduling does not allow access to this area, alternative restricted airspace is available from the Navy (R-2505, R-2508 and R-2524) and the Army (R-2502N), although use of this airspace would also require dynamic scheduling and coordination with these other service users as well. Several MOAs (including Isabella and Owens) are also available adjacent to the other restricted airspace. UAS would also utilize airspace over Fort Irwin and its desert ranges for tactical target acquisition training. As mentioned previously, UAS flight outside of restricted airspace requires an FAA approved COA. The COA would describe the aircraft tasks, operations, ground station and telemetry system. A COA would be required if the UAS would utilize off-shore airspace currently managed by the Navy. Fort Irwin can be accessed without adding COA requirements, however.

2.3.3 Current Operations

Edwards AFB has significant advantages for UAS training. A portion of the existing ranges are being used today by the test community. These are large enough to permit training operations for both initial FTU-2 stand-up and relocation of the current FTU from Creech AFB. The primary concern of selecting Edwards AFB is frequency saturation. All available C-band frequencies are being used by the Edwards AFB test community. With successful test of the C-Band di-plexer, C-Band frequency cards could be increased by 50 percent. Routine FTU operations would need to be scheduled before or after the daily test fly window. Emergency returns would require a coordinated procedure to “borrow” a C-band frequency, similar to the sharing agreement that the National Aeronautics and Space Administration (NASA) has in place. However, with close coordination among all users, C-band would be available until the primary means to control UAS shifts to Ku band. The PPDL would mitigate the C-band demand issues within the next 3 to 4 years.

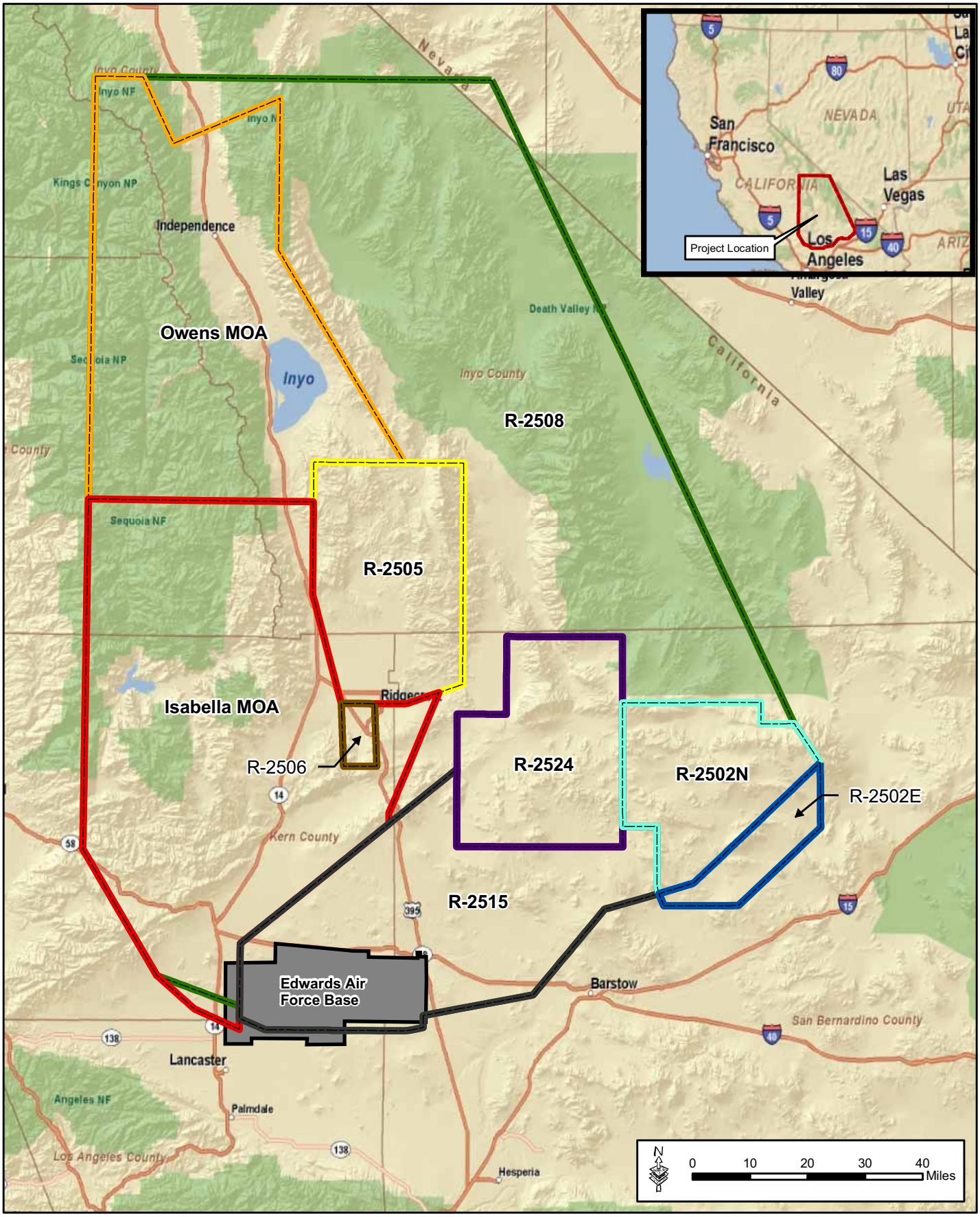

Figure 2-6: Edwards Air Force Base Airspace (R-2508 Complex)

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2.3.4 Current Test/Training Sorties at Edwards

The average number of flights at Edwards AFB ranges from 185 per day over the entire R-2508 complex to 40 per day at Edwards AFB (95th Wing Base 2008). The total number of sorties that occurred at Edwards AFB in 2008 was 9,600, of which, 143 were conducted at night. The majority of the 9,600 sorties occurred during the normal work week (i.e., Monday through Friday); an average of 1,923 sorties per week were conducted in 2008 (Kiernan 2009).

2.3.5 Munitions

Munitions to be used at Edwards AFB would be the same as those described for Holloman AFB. Existing storage space at Edwards AFB can accommodate the required munitions, including up to 120 Hellfire missiles. However, a new Explosive Site Plan would need to be prepared. In addition, a LOLA would also have to be established.

2.3.6 Communication

All facilities would receive communications and information service through the 95 Communications Group (95 CG) as defined in host-tenant support agreements. Telephone, network and special circuit requirements must be identified through the submission of a PWRR request to the 95 CG. ACC would submit requirements for all known communications needs as soon as possible. This would allow the communication squadron enough time to develop the technical solutions and actual costs for requirements.

Base personnel would increase with this beddown action. The 95 CG must coordinate with their base manpower office to determine if sufficient justification exists within the communications squadron to gain a BOS adjustment to their UMD.

2.4 No Action Alternative

CEQ regulations require inclusion of the No Action Alternative as a standard to compare the environmental impacts of the proposed alternatives to the existing conditions. Under the No Action Alternative the UAS FTU-2 beddown would not occur. The No Action Alternative would maintain the environmental *status quo*. Holloman AFB has vacant buildings that would continue to deteriorate requiring maintenance or demolition. Also, the continuing lack of a mission to replace the 20th FS and other discontinued missions will continue to have a negative economic impact on the surrounding community. Continuation of the UAS training at Creech AFB would not allow the ACC to proactively accommodate current demands for CAP growth while enabling UAS normalization for long-term sustainment. The No Action Alternative also would not support the beddown of a second FTU at Creech AFB since the airspace is currently maximized.

2.5 Alternatives Eliminated

2.5.1 Other Bases

A UAS FTU-2 Tiger Team with several representatives from ACC Headquarters compiled a Basing Criteria Matrix that was used to analyze candidate bases for the FTU-2 beddown. A list of six candidate bases for co-located GCS/LRE operations and eight candidate base combinations for split GCS/LRE operations were analyzed to determine if they met the specified criteria in the matrix. Airspace and existing base facilities were the most important criteria to facilitate an FTU stand-up, beginning in FY 2009. The ability to meet this schedule was the primary focus of the selection process. Other criteria included airfield operations, weather, communications, current missions, community support and future missions. Davis-Monthan AFB/Fort Huachuca in Arizona along with Holloman AFB and Edwards AFB were the top three installations (in order of matrix score) that met the initial specified criteria in the Basing Criteria

Matrix. The Commander of ACC directed a "First Look" analysis for relocating all MQ-1/MQ-9 FTU training from Creech AFB to determine which installation could accommodate the initial stand-up during FY 2009. For this reason, a site survey was performed at the three installations. The ACC Site Survey Team concluded that the beddown was feasible at Edwards AFB or Holloman AFB but Davis-Monthan AFB/Fort Huachuca would pose enormous challenges to a successful and timely MQ-1/MQ-9 FTU stand-up. The challenges included lack of a MSA, additional MILCON expenses, and the need to conduct UAS operations at a Joint-Use airfield. In particular, the lack of existing facilities for support of FY 2009 initial beddown was of major importance. For these reasons, ACC decided not to carry Davis-Monthan AFB/Fort Huachuca forward for an environmental analysis.

Other bases that were initially considered but did not make the short list analysis for the UAS FTU-2 beddown were MacDill AFB/Avon Park, Hill AFB/Michael Army Airfield (AAF), Cannon AFB/Melrose, Barksdale AFB/Fort Polk, Kirtland AFB/Stallion AAF, Patrick AFB/Avon Park, Luke AFB/Gila Bend. These bases were eliminated because they did not meet the specified criteria in the Basing Criteria Matrix, as indicated in Table 2-7.

Table 2-7. Alternative Bases Eliminated

Eliminated Bases	Reasons for Elimination
RSO GCS/LRE	
Fort Huachuca/Davis-Monthan	Facilities, lack of air-to-ground range, lack of MSA
MacDill AFB/Avon Park	Facilities at Avon Park
Hill AFB/ Michael AAF	Facilities at Hill AFB
Cannon AFB/Melrose	Inadequate range/ lack of restricted airspace
Barksdale AFB/Fort Polk	Facilities and airspace
Kirtland AFB/Stallion AAF	Facilities
Patrick AFB/Avon Park	Current mission and runway
Luke AFB/Gila Bend	Facilities at both locations
Co-Located GCS/LRE	
Creech AFB	BOS and C-band availability
Patrick AFB	Facilities/current mission
Fallon NAS	Facilities and airspace
Avon Park	Facilities

*GCS/LRE=Ground Control Stations/Launch and Recovery

2.5.2 Other Sites on Holloman AFB

2.5.2.1 North Ramp Option B

The North Ramp (Option B) at Holloman AFB (see Figure 2-2) was also considered for the UAS FTU-2 beddown. The North Ramp, also known as the Test Ramp, hosts the 46th Test Group, the QF-4 mission, and an Army Air contingent. In order to use this location for FTU-2, existing units would need to be relocated and a high MILCON investment would be required. The only facility that could be converted for the new mission is Building 1080, which is a maintenance hangar. All other facilities would need to be acquired through new construction. The ACC Site Survey Team concluded that Option B would pose an enormous challenge in a successful and timely MQ-1/MQ-9 FTU-2 move, especially within FY 2009. For these reasons, ACC decided not to carry this option forward for an environmental analysis.

2.5.2.2 Undeveloped Northwest Area Option C

Option C is located in an undeveloped area northwest and adjacent to Runway 04/22 (see Figure 2-2). This option would result in extensive MILCON for required facilities and

infrastructure, including ramp space and a taxiway. No existing facilities exist in the immediate area which could be leveraged to support the FTU-2 mission in FY 2009 or in the near future. The ACC Site Survey Team concluded that Option C would pose an enormous challenge in a successful and timely MQ-1/MQ-9 FTU-2 move. For these reasons, ACC decided not to carry this option forward for an environmental analysis.

2.5.3 Other Sites on Edwards AFB

2.5.3.1 Main Base Option B

The Main Base option is the least desired option from an operational standpoint since the UAS operations would be in the same area as the Main Base testing area (Figure 2-7). The Main Base option would not require a LOLA or runway repairs; however, it would require the need for additional ramp space to be constructed. For these reasons, ACC decided that this is not the best option at Edwards AFB.

2.5.3.2 South Base Option C

The South Base option is at the west end of the current ramp area (Figure 2-7). The runway at the South Base is in need of extensive repair, therefore, making this the most expensive option site. The estimated costs for repair of this runway are based on repairing the existing concrete runway. Depending on the future use of this runway, there may be less expensive repair measures than replacement of the concrete slabs; however, none of the repairs could be accomplished in time to satisfy the FY 2009 stand-up schedule. A LOLA would also be required along the South Base runway. Additional ramp space must also be constructed for the South Base option. ACC decided that this option is not the best option at Edwards AFB due to the delays caused by extensive runway repairs required and the proximity to the base testing area.

2.6 Comparative Summary of Impacts

Potential environmental impacts of the Proposed Action would be those associated with the construction and renovation of UAS training facilities and the operation and maintenance of the MQ-1/MQ-9s. Table 2-8 presents a summary of the potential impacts associated with the two action alternatives, compared to the No Action Alternative.

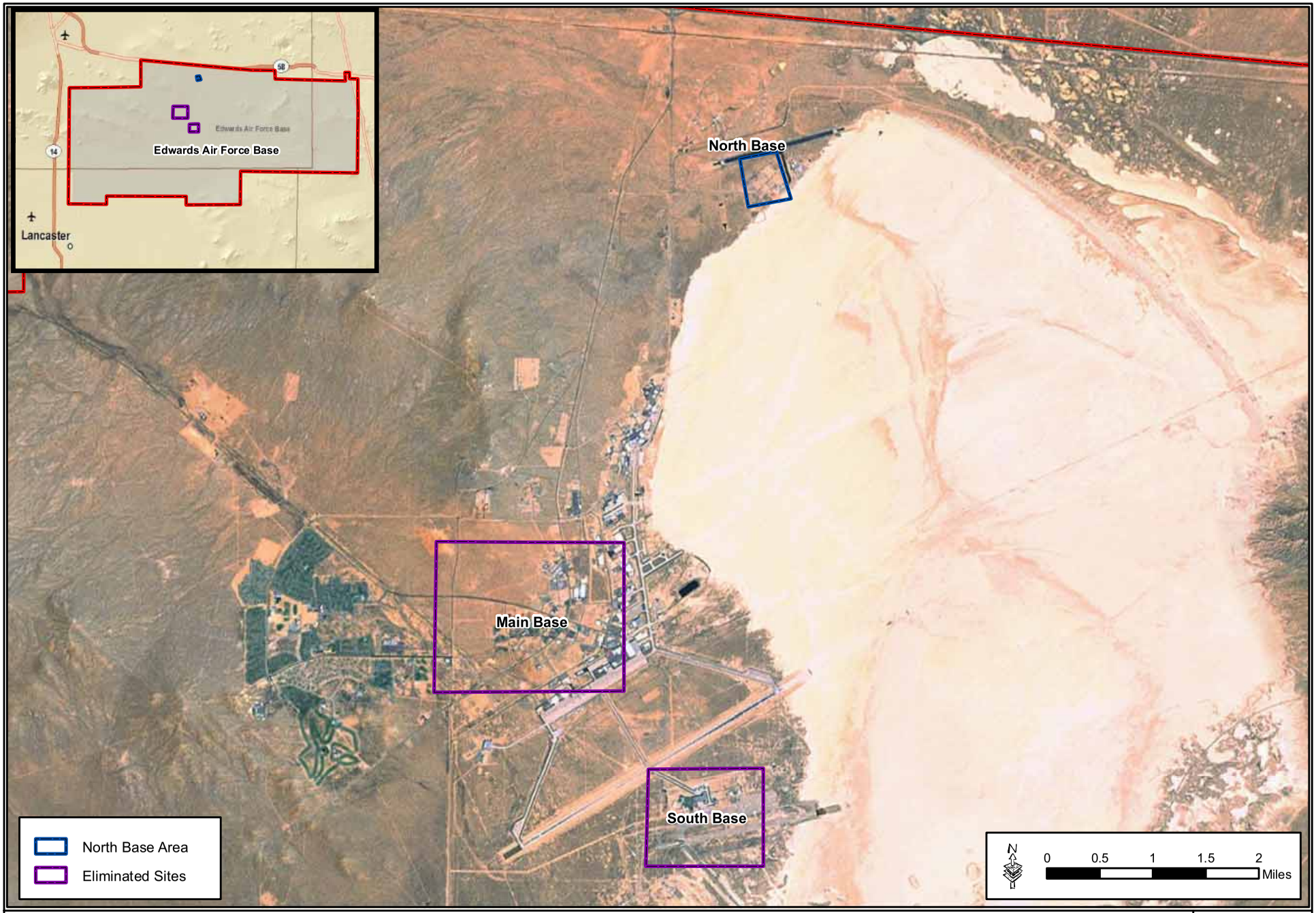

Figure 2-7: Edwards Air Force Base Eliminated Sites

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Table 2-8. Summary of the Potential Impacts of Proposed Action and No Action Alternatives

	Holloman	Edwards	No Action
Transportation	Minor to moderate increases in on-base traffic during daily commute. These increases would be less than historic traffic counts. Off-base system would still be well below capacity.	Minor to moderate increases in on-base traffic during daily commute. These increases would be less than historic traffic counts. Off-base system would still be well below capacity.	Baseline Conditions as described in Section 3.1 would remain unchanged, and therefore no impact would result.
Land Use	No impacts to land use; land would remain for military operations.	No impacts to land use; land would remain for military operations.	Baseline Conditions as described in Section 3.1 would remain unchanged, and therefore no impact would result.
Aesthetic/Visual Resources	Slight, temporary effects during construction; visual signature of MQ-1/MQ-9 aircraft would be negligible.	Slight, temporary effects during construction; visual signature of MQ-1/MQ-9 aircraft would be negligible.	Baseline Conditions as described in Section 3.1 would remain unchanged, and therefore no impact would result.
Infrastructure	No additional demands would occur to the electrical, wastewater and gas systems. The beddown would have negligible impacts to the water supply.	No additional demands would occur to the electrical, wastewater and gas systems. The beddown would have negligible impacts to the water supply near the North Base. It is recommended that the water demands for the proposed new buildings at school house area be modeled to determine if any improvements to the existing water system are necessary.	Baseline Conditions as described in Section 3.2 would remain unchanged, and therefore no impact would result.
Noise	Noise emissions from proposed aircraft operations would be insignificant compared to existing operations at Holloman AFB. Noise emissions from construction activities are not expected to significantly impact the ambient noise levels on Holloman AFB.	Noise emissions from construction activities are not expected to significantly impact the ambient noise levels on Edwards AFB. Noise emissions from the proposed aircraft operations would be insignificant compared to existing operations at Edwards AFB.	Baseline Conditions as described in Section 3.11 would remain unchanged, and therefore no impact would result.
Air Quality	Air emissions from construction activities are well below *de minimis* thresholds; the annual emissions from the increase of daily commuter traffic and aircraft operations are minor and below *de minimis* thresholds.	Air emissions from construction activities are well below *de minimis* thresholds; the annual emissions from the increase of daily commuter traffic and aircraft operations are minor and below *de minimis* thresholds.	Baseline Conditions as described in Section 3.8 would remain unchanged, and therefore no impact would result.
Water Resources	No significant impacts on the region's water supply or water quality. No potentially jurisdictional wetlands or floodplain occur at the proposed beddown site.	No significant impacts on the region's water supply or water quality. No potentially jurisdictional wetlands or floodplain occur at the proposed beddown site.	Baseline Conditions as described in Section 3.7 would remain unchanged, and therefore no impact would result.
Cultural Resources	Potential to impact one National Register of Historic Places-eligible property at Holloman AFB (Building 301); however, renovations and additions have received concurrence from the New Mexico State Historic Preservation Office.	Potential to impact one National Register of Historic Places-eligible property at North Base area.	Baseline Conditions as described in Section 3.3 would remain unchanged, and therefore no impact would result.

Table 2-8, continued

	Holloman	Edwards	No Action
Biological Resources	No significant impacts to biological resources. There could be potential minor impacts to wildlife that is associated with previously developed areas, such as mice, rats, and birds. Noise from UAS overflights would have negligible impacts on wildlife or protected species. Live and inert munitions have the potential to affect wildlife in the impact areas. However, these targets are used quite frequently and would not cause significant impacts as compared to the No Action Alternative. The construction/renovation activities would not affect any Federally or state-listed species. Operation of the UAS may affect, but is not likely to adversely affect, interior least tern (*Sterna antillarum*), southwestern willow flycatcher (*Empidonax trailii extimus*), and Mexican spotted owl (*Strix occidentalis lucida*). UAS operations would not likely jeopardize northern aplomado falcon (*Falco femoralis septentrionalis*).	No significant impacts to biological resources are expected at the North Base or Bailey Elementary School sites. At the school house area site, there could be impacts to desert tortoise (*Gopherus agassizii*), Mohave ground squirrel (*Spermophilus mohavensis*), burrowing owls (*Athene cunicularia*), and desert cymopterus (*Cymopterus deserticola*). If the preferred beddown location changes to Edwards AFB, Section 7 consultation would be initiated with USFWS.	Baseline Conditions as described in Section 3.5 would remain unchanged, and therefore no impact would result.
Earth Resources	No significant impacts to climate, geology, or prime farmland. Potential minor impacts to desert soil's crusts during mishap recovery operations.	No significant impacts to climate, geology, or prime farmland. Potential minor impacts to desert soil's crusts during recovery mishap operations.	Baseline Conditions as described in Section 3.6 would remain unchanged, and therefore no impact would result.
Hazardous Material/Waste Management	Hazardous materials and wastes would be managed in accordance with USEPA and Air Force Regulations; no significant impacts are expected.	Hazardous materials and wastes would be managed in accordance with USEPA and Air Force Regulations; no significant impacts are expected.	Baseline Conditions as described in Section 3.9 would remain unchanged, and therefore no impact would result.
Socioeconomics and Environmental Justice	Temporary short-term and long-term beneficial impacts to revenue in the region of influence (ROI) would occur. Short-term, temporary adverse impacts on public services could occur but would not be expected to persist. The increased population and demand for housing units at Holloman AFB and in the ROI would not cause significant impacts on either of these resources. No significant adverse impacts to minority or low income populations or youth are expected.	Temporary short-term and long-term beneficial impacts to revenue in the ROI would occur. Short-term, temporary adverse impacts on public services could occur but would not be expected to persist. The increased population and demand for housing units at Edwards AFB and in the ROI would not cause significant impacts on either of these resources. No significant adverse impacts to minority or low income populations or youth are expected.	Baseline Conditions as described in Section 3.4 would remain unchanged, and therefore no impact would result.

Table 2-8, continued

	Holloman	Edwards	No Action
Safety and Occupational Health	No significant impacts to safety and occupational health.	No significant impacts to safety and occupational health.	Baseline Conditions as described in Section 3.10 would remain unchanged, and therefore no impact would result.
Airspace	Increased number of sorties would be below historic levels; close coordination with Air Force and U.S. Army (WSMR and Fort Bliss) airspace managers required for proper scheduling.	Increased number of sorties would be below historic levels; close coordination with Air Force, U.S. Army (Fort Irwin), and Navy airspace managers required for proper scheduling.	Baseline Conditions as described in Section 3.12 would remain unchanged, and therefore no impact would result.

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SECTION 3.0
AFFECTED ENVIRONMENT

3.0 Affected Environment

3.1 Land Use Resources

3.1.1 Holloman AFB

3.1.1.1 Transportation

The modes of transportation available to serve the Holloman AFB include air, train and highway access. The main gate to Holloman AFB is located on U.S. Highway 70 (U.S. 70) approximately 8 miles west of U.S. Highway 54 (U.S. 54). The local train line is owned by Union Pacific and is called the Tucumcari Line which runs along U.S. 54 from El Paso all the way to Wichita, Kansas. The main line is located about 8 miles to the east of Holloman AFB and services freight trains. The Tucumcari rail line historically included a spur line that serviced Holloman AFB; however, it is currently not in service and is disconnected at the Highway 54/70 bypass. The right of way for the spur is maintained, however. A small civilian airport, Alamogordo White Sands Regional Airport, is located approximately 5 miles from the base. Figure 3-1 presents the location of the local roads, train lines, and civilian airport.

There are three automobile access points to Holloman AFB including the Main Gate mentioned above. The West Gate, located at the intersection of U.S. 70 and West Gate Avenue, 1 mile west of the Main Gate, serves all commercial traffic and west side staff. The La Luz gate is located on a northeast corner of the base and provides service for base personnel who live in the area north of Alamogordo. The road network on Holloman AFB is organized into arterials, collector, and local streets. Primary arterials include First Street and West Gate Avenue leading directly to and from the main cantonment gates. Other arterials include Delaware Avenue, 49er Avenue, and Eleventh Street. Kelly Road is classified as a collector street, and provides access around the far west side of the airfield.

The closest major intersection to Holloman AFB is U.S. 70 and U.S. 54, which is located approximately 8 miles east of the Main Gate. An additional 800 automobiles would potentially enter the area due to the increase of students and staff. The 2007 average daily traffic (New Mexico Department of Transportation [NMDOT] 2007) at the intersection of U.S. 70 and U.S. 54 is 8,994 automobiles. The capacity at the intersection is 12,800 automobiles per day producing an un-met capacity of 3,806 automobiles per day (NMDOT 2007).

3.1.1.2 Visual Resources

Visual resources are defined as areas of unique beauty derived from the combined characteristics of the natural aspects of land and human aspects of land use. The assessment of visual and aesthetic values involve a characterization of existing resources in the study area. Visual resources at Holloman AFB consist of man-made landscape features and natural features that appear indigenous to the area.

The major visual characteristic of southern New Mexico lies in its vast areas of naturally occurring landscape and scenic mountain ranges. The White Sands National Monument is located 1.5 miles to the west of the base and the Lincoln National Forest is located 10 miles to the east. Visual resources vary throughout the proposed air space corridor, which includes vast open areas of arid desert land, white sands, lava flows, and areas of unique native animals and vegetation. Some of these flora and fauna species are endemic to the unique geologic features found within the region that add to the visual value of the project corridor.

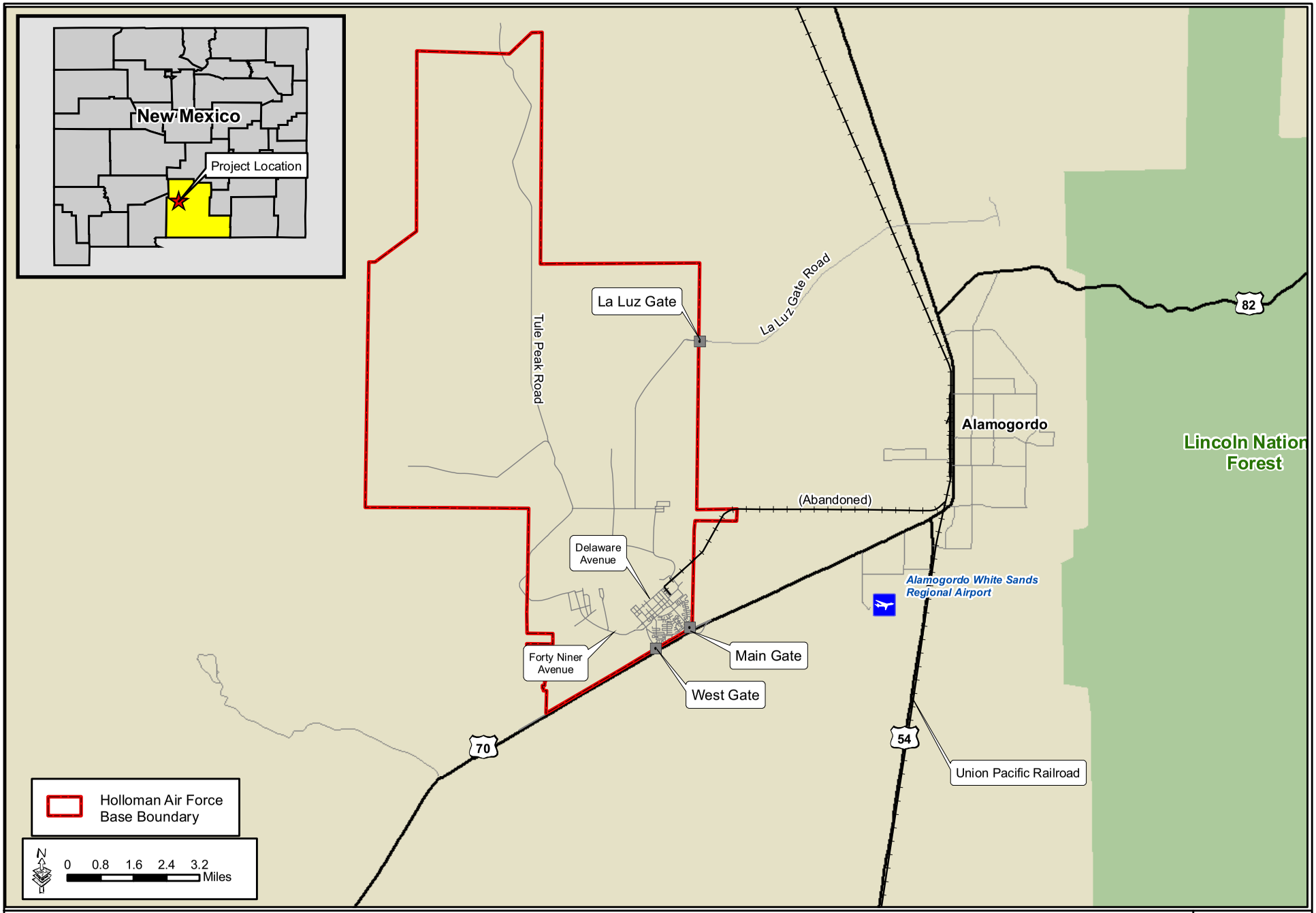

Figure 3-1: Holloman Air Force Base Transportation Map

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3.1.1.3 Land Use

The proposed beddown facilities are located on previously disturbed land adjacent to existing buildings on Holloman AFB grounds. The heaviest concentration of facilities is in the south end of the base and flanks the southern side of the airfield. Other facilities are in the north and west areas of the base. These areas have airfield pavement and involve a mixture of industrial, aviation-related, administrative, and community uses. The main area, or cantonment, includes a mixture of uses similar to those of a small town or city with housing, outdoor recreation, offices, and medical land uses. Within 1 mile north of the cantonment area is a scatter of mission, industrial, mission support, recreational and historic facilities. Further north there are very few facilities, as the vast majority of the northern 40,000 acres of Holloman AFB is undeveloped open space. Some open space serves as a buffer required for safety clearances, security areas, utility easements, and environmentally sensitive areas.

MQ-1 and MQ-9 training exercises would occur over Holloman AFB, Fort Bliss and WSMR. To the south and northeast of Holloman AFB, land is owned and administered by the U.S. Bureau of Land Management (BLM). White Sands National Monument is located to the southwest. WSMR surrounds the Monument and borders Holloman AFB to the north, west, and south. A combination of Federal, state, Tribal and private lands are located to the east, southeast, and southwest of the base. Grazing is the primary use close to the base. Government entities own and manage the majority of the land surrounding the airfield. Wetlands to the south of the base have been preserved and recreational activities are permitted on public open space.

3.1.2 Edwards AFB

3.1.2.1 Transportation

One U.S. highway and two state highways connect Edwards AFB to the local communities and the interstate highway system. U.S. Highway 395 parallels the eastern boundary and leads to Interstate (I)-15, 40 miles to the south near Victorville. California Highway 58 parallels the northern boundary and leads 50 miles eastward to Barstow and I-15. Westward it leads 77 miles through Mojave, Tehachapi, and Bakersfield to I-5. Auto access through Edwards AFB is attained through two primary streets that carry the majority of traffic: Rosamond and Lancaster Boulevards. Four secondary streets distribute traffic from the primary streets to the residential areas and between the residential areas and the industrial and flightline areas. These are Forbes and Wolfe Avenues, and Yeager and Fitzgerald Boulevards. All other streets are classified as tertiary streets, serving individual areas on the installation. A network of unpaved roads and jeep trails provide access to the remote undeveloped areas of the installation.

Freight service is provided to the installation by the Burlington Northern Santa Fe (BNSF) Railroad from its mainline that parallels the northern boundary. A rail spur connects the BNSF main line to the government-owned rails servicing the Main Base. The primary government rail spur is routed along Rosamond Boulevard to the supply warehouse area. Additional spurs lead from the warehouse to the unconventional fuel storage area and the Petroleum, Oil, and Lubricants (POL) storage area. The closest civilian airport, located approximately 80 miles away at Meadows Field, is 5 miles north of Bakersfield, California. Figure 3-2 presents the location of the local roads, train lines, and civilian airport.

3.1.2.2 Visual Resources

Visual resources near the proposed construction sites on Edwards AFB consist of man-made landscape features. There are no designated scenic routes, scenic views, or vistas recognized by the Federal, state or county government located adjacent to the proposed construction sites. Edwards AFB is situated in the Antelope Valley within the Mojave Desert. It is bounded to the northwest by the Tehachapi Mountains and the south-southwest by the San Gabriel Mountains.

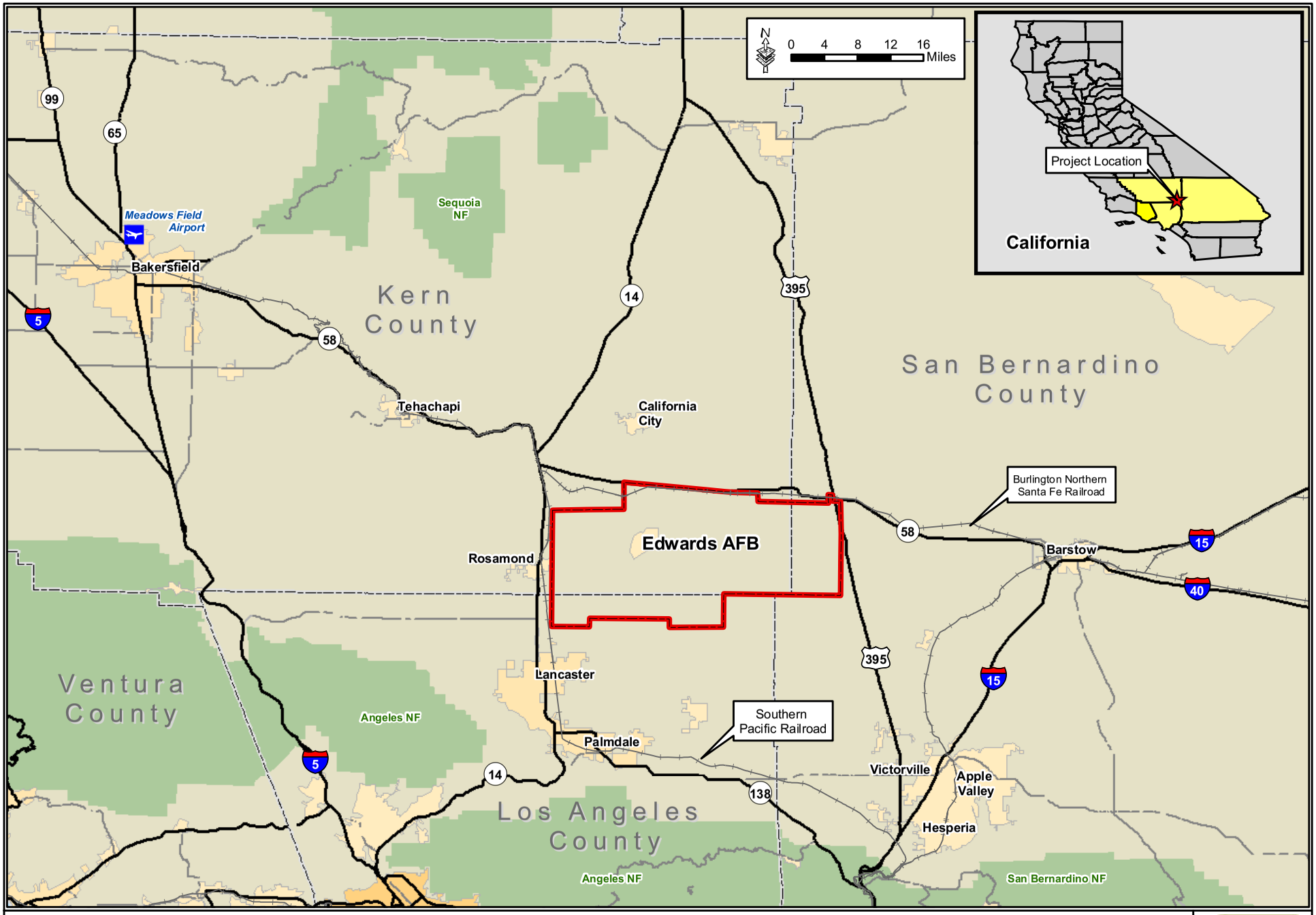

Figure 3-2: Edwards Air Force Base Transportation Map

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A large portion of the land in the region is public property such as Death Valley National Park, Mojave National Preserve, and Joshua Tree National Park. Edwards AFB air space is located above vast desert and mountain ranges.

3.1.2.3 Land Use

Edwards AFB consists of 308,000 acres located in Kern, Los Angeles, and San Bernardino counties. The base contains largely undeveloped or semi-improved land that is used to support the flight testing of a wide variety of military, civilian, and experimental aircraft. The developed portion of the base includes approximately 6 percent of the total base area and is concentrated on the west side of Rogers Dry Lake. The developed areas include Main Base, South Base, North Base, and Air Force Research Laboratory (AFRL). The Edwards Air Force Base General Plan (Edwards AFB 2002) establishes land use designations for the base. Much of Edwards AFB is surrounded by government lands managed by the BLM, U.S. Forest Service (USFS) and State of California. The large population areas of Los Angeles County are located 60 miles southwest on the opposite side (western) of the San Gabriel Mountains.

3.2 Infrastructure

This section identifies the utilities infrastructure near the proposed beddown sites at Holloman and Edwards AFBs including electrical, water, wastewater, gas, storm drainage, liquid fuels and communication systems. An Area Development Plan (ADP) for the MQ-1/MQ-9 FTU-2 beddown was prepared as a separate document and includes detailed information regarding the infrastructure and utilities at Holloman AFB and Edwards AFB; thus most of the information used to prepare this section was gathered from the ADP. Appendix A contains the ADP for Holloman AFB. The Edwards ADP was not completed since Holloman AFB was identified as the preferred location during the preparation of the EA.

3.2.1 Holloman AFB Alternatives

3.2.1.1 Electrical Distribution

The proposed MQ-1/MQ-9 FTU-2 beddown site is located in an area that has already been developed and is utilizing existing building and utility infrastructure. The electrical supply to Holloman AFB is delivered by the El Paso Electric Company. Electrical distribution lines currently serve the existing buildings proposed to be utilized for the MQ-1/MQ-9 FTU-2 beddown area, and have sufficient capacity to provide the needed power.

3.2.1.2 Potable Water/Fire Protection System

Holloman AFB relies on surface water and groundwater for potable water. Holloman AFB is provided potable water by the City of Alamogordo and various wells located 12 to 15 miles east of the base near the foothills of the Sacramento Mountains. Surface water from Bonito Lake and natural springs located in Fresnal and La Luz Canyons is transported through pipelines to reservoirs at the City of Alamogordo's La Luz water treatment plant. The La Luz water treatment facility transports treated water to the Boles Field Pumping Station then to the base via pipeline. Three tanks are designated for potable water storage on Holloman AFB: Eagle Tower with a capacity of 0.3 million gallons (MG) (0.9 acre-feet); Challenger Tank with a capacity of 0.4 MG (1.2 acre-feet); North Area Tower with a capacity of 0.25 MG (0.8 acre-feet), having a total capacity of 0.95 MG (2.9 acre-feet). These three tanks also serve to keep pressure on water in pipelines serving the base and are constantly being filled by water pumped via pipeline from off-base locations. Groundwater is also drawn from a total of 15 wells with an average depth of 450 to 550 feet from five wellfields including the Boles, Escondido, San Andreas, Frenchy, and Douglas wellfields. Some of the installation's wells have been installed to depths of 1,000 feet below ground surface (bgs). Groundwater extracted from the well fields

is transported via pipeline to two ground level storage tanks with a total capacity of 0.9 MG (U.S. Air Force 2006). These water storage tanks are constantly being filled to prevent water deficits from occurring on-base. In 2006, average daily water demand on-base was approximately 2.1 million gallons per day (MGD) (6.4 acre-feet) or approximately 766 MG per year (U.S. Air Force 2006). The average current usage for FY 2008-2009 has been estimated to be approximately 1.2 MGD. The water usage reduction over the historic average is likely due to pipe ugrades, leakage controls, housing demolition, infrastructure repair and mission reduction. The existing buildings to be used for the MQ-1/MQ-9 FTU-2 beddown are currently served by existing water infrastructure.

3.2.1.3 Wastewater

The buildings to be used by the proposed MQ-1/MQ-9 FTU-2 beddown are currently served by the existing gravity sewer system. Holloman AFB has a wastewater treatment plant that can treat an average of 1.5 MGD with an average flow of 1.0 MGD (U.S. Air Force, 2006). Holloman AFB has begun and mostly completed the project of replacing Vitrified Clay Pipe (VCP), which has been historically used for sewer mains, to the current industry standard of Polyvinyl Chloride (PVC) pipe as occasions and funding arise. This project has resulted in a reduced inflow to the wastewater treatment plant to 0.7 MGD and the wastewater treatment plant is estimated to be operating at less than 50 percent capacity.

3.2.1.4 Gas

Natural gas service is currently being provided to Holloman AFB by the New Mexico Gas Company. The buildings proposed to be used by the MQ-1/MQ-9 FTU-2 beddown are currently connected to the existing gas system.

3.2.1.5 Storm Drainage System

Many areas within the base are subject to extensive ponding of rainfall runoff during various storm events. During a site visit to the base, few catch basins used to intercept runoff were located. The majority of runoff appeared to be directed to inadequately sized retention basins located in open space areas. The proposed area for the MQ-1/MQ-9 FTU-2 beddown area is subject to some of this runoff ponding.

3.2.1.6 Liquid Fuels

Building #315 (see Figure 2-3) in the proposed MQ-1/MQ-9 FTU-2 beddown area is used for fuel cell maintenance and is a storage site for AVGAS and JP-8. The site currently stores fuel for the T-38 trainer aircraft.

3.2.1.7 Communications System

All facilities being used for the MQ-1/MQ-9 beddown would receive communications and information service through the 49 CS as defined in host-tenant support agreements. The existing communications infrastructure consists of telephone, unclassified network (non-secure internet protocol router network [NIPRNET], classified network (secure internet protocol router network [SIPRNET] and defense messaging system (DMS). These systems consist of underground conduits with manhole access.

3.2.2 Edwards AFB Alternatives

3.2.2.1 Electrical Distribution

The electrical supply to Edwards AFB is delivered by Southern California Electric (SCE). Entering from the north, SCE maintains 115 kilovolt (KV) distribution lines within the base's boundary. Located just west of North Base is a switching station. From this switching station, 34.5 KV lines exit to the east and serves Edwards AFB. From this point on, Edwards AFB

personnel monitor and maintain the electrical infrastructure that serves the base. Edwards AFB maintains several substations, 34.5 KV overhead lines and both overhead and underground 12 KV electrical lines.

The North Base and the school house area are currently located near existing electrical infrastructure. The North Base has electrical infrastructure currently being delivered to the existing building.

3.2.2.2 Potable Water/Fire Protection System

The primary source of potable water to serve Edwards AFB is derived from groundwater sources via base owned well pumping stations and the remainder, mostly targeted for use by the North Base, is purchased from the Antelope Valley East Kern Water District (AVEK). The North Base supply system previously consisted of one well, N-2, that was installed in 1964 (drawing water from the unconfined aquifer of the North Muroc subbasin) but was taken off line in 1995 due to elevated arsenic concentrations. Water purchased from AVEK has replaced the water formerly provided by the contaminated N-2 well. The water then flows into two storage tanks for subsequent distribution throughout the base. AVEK water can be, and often is, mixed with Edwards AFB groundwater to provide additional water to the Main Base area (Edwards AFB 1999 and 2002). The average daily water demand on the Main Base has been reported as 4.0 MGD (approximately 4,500 acre-feet per year), which normally can be supplied by imported surface water. However, the demand is much higher in the summer. Peak summer use is approximately 12 MGD. Therefore, groundwater pumpage is still required (Edwards AFB 2002a). NASA, an independent tenant operating out of Edwards AFB, purchases water from the base.

The North Base area for the proposed MQ-1/MQ-9 FTU-2 hangar, casket storage, and AMU/LRE site is currently served with water infrastructure. The school house area is also located near existing water system main lines.

3.2.2.3 Wastewater

The North Base and school house area of the proposed MQ-1/MQ-9 FTU-2 beddown site is currently served by the existing combination gravity and force main sewer system. Edwards AFB has two operating wastewater treatment plants. The plants can treat an average of 2.5 MGD (95th Air Base Wing 2008).

3.2.2.4 Gas

The natural gas provider for Edwards AFB is Pacific Gas and Electric (PG&E). The existing buildings located at North Base are currently connected to the existing gas system. The school house area is located near existing gas lines.

3.2.2.5 Storm Drainage System

The storm drainage system within Edwards AFB is designed primarily to keep runoff away from the flight line. The storm drainage system collects runoff from the streets and parking lots by way of catch basins and grate inlets and diverts them via storm pipes to open areas which ultimately outlet to the existing dry lake bed encompassing a large area within the base's boundary.

3.2.2.6 Liquid Fuels

At Edwards AFB there are multiple storage tank sites and distribution mains and hydrants which help to deliver fuel within the base. The current practice at Edwards AFB, however, is fueling the aircraft by tanker trucks.

3.2.2.7 Communications System
All facilities being used for the MQ-1/MQ-9 FTU-2 beddown would receive communications and information service through the 95 CG as defined in host-tenant support agreements. The existing communications infrastructure consists of underground conduits with manhole access.

3.3 Cultural Resources

3.3.1 Holloman AFB
3.3.1.1 Cultural Background
The area including Otero County, New Mexico has had a very long and varied cultural past. The ICRMP for Holloman AFB (U.S. Air Force 2005) provides an extensive summary of the current understanding of the cultural past for the region that includes the Proposed Action considered in this environmental assessment. The cultural resources overview described in Appendix A of the 2005 ICRMP Holloman AFB is incorporated herein by reference.

3.3.1.2 Previous Investigations
A search of the New Mexico Cultural Resource Information System (NMCRIS) was conducted to determine if previously reported cultural resources surveys and sites were located within 1 mile of the proposed MQ-1/MQ-9 FTU-2 beddown site at Holloman AFB. The search revealed 24 previous cultural resources surveys were conducted in the vicinity of the proposed beddown site. These surveys are summarized in Table 3-1.

The NMCRIS search also found five previously reported cultural resources sites were located with a mile of the Proposed Action location (Option A Site). Three sites, LA 99789, LA 108117 and LA 105442 were reported to be the remains of historic base structures with limited research potential. The sites were recommended not eligible for National Register of Historic Places (NRHP) listing. None of the sites are located within the Area of Potential Effect (APE) for the proposed FTU-2 beddown.

Site LA 104254 is a multi-component site with diagnostic lithic artifacts and features dating from the Paleo-Indian Period (11000 – 10000 Before Present) and the Archaic Period (7500 – 2200 BP) according to the site report. This site was recommended eligible for NRHP listing under Criterion D for having potential to yield significant information pertinent to prehistoric cultures. Site LA 104254 is not located within the APE for the proposed FTU-2 beddown.

According to the site report, LA 99790 was first reported by the DoD in 1993 with little information as to the nature of the site (Tagg 1993). A follow up survey by Geo-Marine, Inc. in 1996 failed to relocate the site, resulting in a not eligible recommendation (Sale et al. 1996). The alleged location of the site is outside of the APE for the proposed beddown site.

A review of building records from the Holloman AFB World War II (WWII)/Early Cold War Survey revealed two of the buildings proposed to be used under the proposed beddown are of WWII age. Building 301 was evaluated in 1996 and is one of the oldest continuously used structures on the base. Built in 1944, with improvements through 1957, the building still retains its original wood arched truss construction. The building survey recommended the building eligible for listing on the NRHP (Fulton and Cooper 1996).

Table 3-1. Summary of 24 Previous Cultural Resources Surveys

NMCRIS Activity No. for Surveys	Sites Reported by Survey within One-Mile of Project Area	Date Reported	Agency
24767	None	1989	USACE, Albuquerque District
42024	None	1992	US Department of Defense
46373	LA104254*, LA105442*	1994	Human Systems Research
22681	None	1980	Bohannon-Houston, Inc.
23413	None	1987	USACE, Albuquerque District
21444	None	1989	USACE, Albuquerque District
32135	None	1990	USACE, Albuquerque District
42517	None	1993	US Air Force Holloman Air Force Base
37330	None	1991	USACE, Albuquerque District
77286	None	2001	US National Parks Service White Sands National Monument
42025	None	1992	US Department of Defense
42520	LA 99789*, LA99790*	1993	US Department of Defense
39067	None	1992	University of New Mexico office of Contract Archaeology
48325	None	1994	US Air Force Holloman Air Force Base
32107	None	1990	NM State Highway and Transportation Dept.
41399	None	1993	NM State Highway and Transportation Dept.
86732	None	2004	Marron and Associates
48326	None	1994	US Air Force Holloman Air Force Base
21446	None	1989	USACE, Albuquerque District
45639	None	1994	US Air Force Holloman Air Force Base
23411	None	1987	USACE, Albuquerque District
45488	None	1994	US Air Force Holloman Air Force Base
47962	LA108117*	1996	Geo-Marine, Inc.
54521	LA 99789, LA99790, LA104254, LA105442, LA108117	1997	Geo-Marine, Inc.

* Discovering Activity

All reports on file at the Archaeological Records Management Section (ARMS) of the New Mexico State Historic Preservation Division

Building 302 was also evaluated in 1996 and was found to no longer retain its historic integrity. Though initially constructed in 1942, the building has been modified periodically over the years with most of the original architectural design characteristics removed, altered or obscured. The survey determined Building 302 ineligible for NRHP listing (Fulton and Cooper 1996).

3.3.2 Edwards AFB

3.3.2.1 Cultural Background

The 2007 ICRMP for Edwards AFB also provides an extensive summary of the cultural past for the region encompassing Edwards AFB in Appendix H. Appendix H of the 2007 ICRMP Edwards AFB (Loechl et al. 2007) is incorporated herein by reference.

In preparation for this EA, the Edwards AFB Base Historic Preservation Officer (BHPO) was consulted regarding cultural resources in the vicinity of the proposed MQ-1/MQ-9 FTU-2 beddown. The BHPO indicated the area in the vicinity of the Bailey Elementary School and proposed "school house" area on the Main Base have been previously surveyed and no cultural resources were reported for those areas. Additionally, 80 percent of the North Base area has been previously surveyed in over 50 cultural resources surveys. Within 1 mile of the proposed FTU-2 Beddown is the Jet Propulsion Laboratory, which is recommended eligible for NRHP listing for its historic role in testing jet aircraft (Johannesmeyer and Ronning 1994). Additionally, Rogers Lake, immediately east of the proposed beddown area at North Base was designated a National Historic Landmark in 1985 for its historic role in the space program. The North Base proper has been evaluated for NRHP eligibility and found to not be eligible as a historic district; however, Building 4305 a World War II-era hangar built in 1943 and located in the vicinity of the proposed beddown area was recommended individually eligible (Kilanowski et al. 1992).

3.4 Socioeconomics and Environmental Justice

For the purposes of this EA, socioeconomics includes employment and income, population, housing, and public schools. The ROI for socioeconomics at Holloman AFB is Otero County, New Mexico and the ROI for Edwards AFB is Kern, Los Angeles, and San Bernardino counties, California (Figure 3-3).

3.4.1 Holloman AFB

3.4.1.1 Employment and Income

Otero County encompasses nearly 4.3 million acres, of which 68 percent of land is owned by the U.S. government and 10 percent is owned by the state government. The county's economy is dependent on business activities on those lands (Otero County 2006). The largest industries in the areas surrounding Holloman AFB include government and government enterprises (10,655 jobs), retail trade (2,998), and construction (2,070) (U.S. Bureau of Economic Analysis 2006a). The U.S. military is a major economic contributor for Otero County.

Holloman AFB and WSMR combined make up a military/civilian annual payroll of more than $255 million and an economic impact of over $485 million to the local economy (Otero County 2006).

The 2006 per capita personal income (PCPI) for Otero County was $22,798 and ranked 25th in the state (Table 3-2; U.S. Bureau of Economic Analysis 2006b). This PCPI was 76 percent of the state average ($29,929) and 62 percent of the national average ($36,714). The 1996-2006 average annual growth rate of the Otero County PCPI was 4.0 percent, lower than both the average annual growth rate for the state (4.6 percent) and the Nation (4.3 percent) (U.S. Bureau of Economic Analysis 2006b).

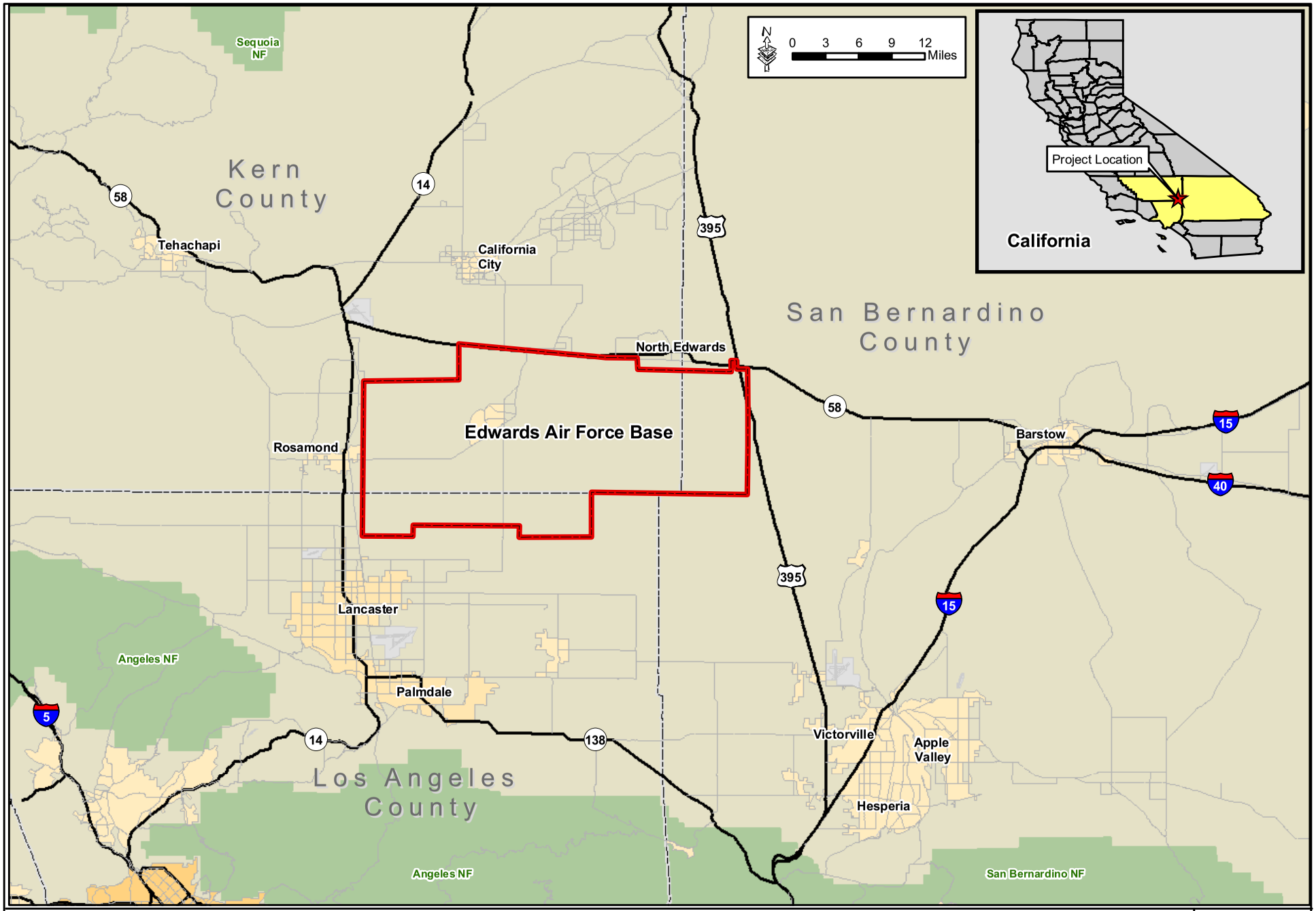

Figure 3-3: Communities within the Edwards Air Force Base Region of Influence (ROI)

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Table 3-2. Income and Median Household Income for the Nation, New Mexico, and Otero County

Location	Per Capita Personal Income (PCPI)	PCPI 1996-2006 Average Annual Growth Rate (percent)	Median Household Income
United States	$36,714	4.3	$46,242
New Mexico	$29,929	4.6	$37,603
Otero County	$22,798	4.0	$34,422

Sources: U.S. Bureau of Economic Analysis 2005a and 2006a

Otero County had 26,288 persons in the labor force in 2007 and the unemployment rate was 3.6 percent (LASER 2007a). The 2007 unemployment rate for Otero County was comparable to the unemployment rate in New Mexico of 3.5 percent (LASER 2007b).

3.4.1.2 Population

Otero County had 62,298 persons in census year 2000, and its population increased by only 1 percent to 63,076, in the 3-year census ending in 2007 (U.S. Census Bureau 2000a and 2007a). Holloman AFB and surrounding communities account for 63 percent of Otero County's census year 2000 population (Table 3-3). Total population for Holloman AFB and the communities surrounding it for census year 2000 was 41,271 persons (U.S. Census Bureau 2000b, 2000c, 2000d and 2000e). Communities surrounding Holloman AFB include Alamogordo, Tularosa and Cloudcroft. In census year 2000, there were 2,076 persons living at Holloman AFB (U.S. Census Bureau 2000a). Holloman AFB had 2,679 personnel assigned on base in 2007 (Holloman AFB 2009).

Table 3-3. Census Year 2000 Population of Otero County, Holloman AFB and Nearby Communities

Location	Population	Percent of County
Alamogordo	35,582	57.1
Tularosa village	2,864	4.6
Cloudcroft village	749	1.2
Holloman AFB	2,076	3.3
Otero County	62,298	

Sources: U.S. Census Bureau 2000a, 2000b, 2000c, 2000d and 2000e

3.4.1.3 Housing

Total housing units as reported in U.S. Census data include a house, an apartment, a mobile home or trailer, a group of rooms, or a single room that is occupied, or, if vacant, is intended for occupancy as separate living quarters. Housing units, as reported in the U.S. Census Bureau data, do not include dormitory-style units. Otero County has 29,272 housing units, and 6,288 of them were vacant in the year 2000 census (U.S. Census Bureau 2000a). There are 18,578 total housing units on Holloman AFB and communities surrounding Holloman AFB, of which 16 percent were vacant in the year 2000 (Table 3-4). On Holloman AFB, there are 427 total housing units, with 8 percent vacancy (U.S. Census Bureau 2000b). Current family housing data for Holloman indicate that there are approximately 600 family units on base and within the next year, there will be approximately 900 available (Holloman AFB 2005). Temporary quarters

(i.e., dormitory-style housing units or barracks) are available at Holloman AFB, although total number and vacancy rates are unknown.

Table 3-4. Housing Units in the ROI and Nearby Communities

Location	Total Housing Units	Occupied (percent)	Vacant (percent)
Alamogordo	15,920	13,704 (86)	2,216 (14)
Tularosa	1,311	1,134 (87)	177 (14)
Cloudcroft	920	320 (35)	600 (65)
Holloman AFB	427	393 (92)	34 (8)
Otero County	29,272	22,984 (67)	6,288 (21)

Sources: U.S. Census Bureau 2000a, 2000b, 2000c, 2000d and 2000e

3.4.1.4 Schools

There are two elementary schools and one middle school located on Holloman AFB. They are part of Alamogordo Public Schools.

3.4.1.5 Environmental Justice

The fair treatment of all races has been assuming an increasingly prominent role in environmental legislation and implementation of environmental statutes. In February 1994, President Clinton signed EO 12898 titled, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. This action requires all Federal agencies to identify and address disproportionately high and adverse effect of its programs, policies, and activities on minority and low-income populations. Approximately 26 percent of Otero County persons of a single race reported being part of a minority population (i.e., reported a race other than White; Table 3-5), and 32.2 percent of persons of all races claimed Hispanic or Latino origin (U.S. Census Bureau 2000a). Otero County has a lower minority population than the State of New Mexico. Otero County's median household income is about 8 percent lower than the state median household income and 26 percent lower than the national median household income (see Table 3-2). In Otero County, there is a slightly lower percentage of people in poverty than in the State of New Mexico (see Table 3-5).

Table 3-5. Minority Population and Poverty Data for the Nation, New Mexico and Otero County

Location	Minority Population (percent)	All Ages in Poverty, (percent)
United States	25	13.3
New Mexico	33	18.4
Otero County	26	17.4

Sources: U.S. Census Bureau 2000a, 2000f, and 2005a

EO 13045 requires each Federal agency "to identify and assess environmental health risks and safety risks that may disproportionately affect children"; and "ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." This EO was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults. Youth are defined as persons less than 18

years old. In Otero County, 30 percent of the population is children, which is comparable to the percentage of children in New Mexico (28 percent; U.S. Census Bureau 2000a and 2000f). On Holloman AFB and in nearby Alamogordo, 25 and 28 percent of the population is children, respectively (U.S. Census Bureau 2000b). The potential for impacts to the health and safety of children would be greater where projects are located near residential areas. The proposed action is not located near general public schools, residences, or parks (i.e., near areas populated with children).

3.4.2 Edwards AFB

3.4.2.1 Employment and Income

The government and government enterprises sector employs the most people in Kern, Los Angeles, and San Bernardino counties (U.S. Bureau of Economic Analysis 2006c, 2006d, and 2006e). The next highest employment sector in the three counties is retail trade. Edwards AFB is one of the primary employers in Kern County. Edwards AFB makes a substantial contribution of the economic status of the surrounding communities. For FY 1998, the estimated cumulative economic impact from Edwards AFB's annual operating expenditures, including salaries, DoD acquisitions, and educational assistance in the surrounding communities was $1.3 billion (95th Air Base Wing 2008, AAFTC 1998). Los Angeles County has the lowest unemployment rate and Kern County has the highest average unemployment rate of the counties across the ROI (Table 3-6).

Table 3-6. Labor Force, Unemployment, Per Capita Personal Income and Median Income in California, the Nation, and Across the ROI

Location	2008 Labor Force	2008 Unemployment Rate (percent)	2006 Per Capita Personal Income	Median Household Income
United States	151,062,383	4.2*	$36,744	$46,242
California	18,422,473**	7.0**	$39,626	$53,627
Kern	363,046**	9.8**	$25,938	$40,146
Los Angeles	4,953,200**	7.0**	$37,362	$48,166
San Bernardino	895,136**	7.8**	$27,134	$48,761

Sources: California EDD 2008a, 2008b, 2008c and 2008d, U.S. Bureau of Economic Analysis 2006f, g, h, U.S. Census Bureau 2007a

* This rate is based on the civilian labor force, not the total labor force.

**These values are an average of the first 11 months of 2008; December 2008 data were not available.

PCPI for Kern and San Bernardino counties are lower than the PCPI of the State of California ($39,626) and the Nation ($36,744). However, the Los Angeles County PCPI is only 5.7 percent lower than the PCPI for the State of California and is approximately 2 percent higher than the PCPI for the Nation. The median household income across the ROI is between 9 and 25 percent lower than the state median household income. Los Angeles and San Bernardino counties have a higher median household income than the Nation (see Table 3-6).

3.4.2.2 Population

Towns that share a border with the Edwards AFB boundary include Lancaster, California City, North Edwards and Rosamond (see Figure 3-3). The population of Edwards AFB and nearby communities totaled 146,000 in census year 2000 (U.S. Census Bureau 2000g). The population of Edwards AFB (5,909) accounts for less than 1 percent of the 2000 population of

the ROI (Table 3-7). The on-base population of civilians and military personnel as of 2003 was 16,890 and has declined to 14,015 in 2007 (Edwards AFB 2009).

Table 3-7. Census Year 2000 Population of Edwards AFB Base and Counties

Location	Population
Edwards AFB	5,909
Kern County	661,645
Los Angeles County	9,519,338
San Bernardino County	1,709,434

Sources: U.S. Census Bureau 2000g, 2000h, 2000i and 2000j

3.4.2.3 Housing

Census year 2000 data indicate that there is only a 6 percent housing vacancy at Edwards AFB and 10, 4, and 12 percent vacancies in Kern, Los Angeles, and San Bernardino counties, respectively (Table 3-8). Census year 2007 data for Kern, Los Angeles and San Bernardino indicate that the house vacancy percentage in Kern and San Bernardino have not changed since the census year 2000 (U.S. Census Bureau 2007b and 2007c). However, in Los Angeles County, the housing vacancy has increased 1 percent, and in the census year 2007, 5 percent of the housing units were vacant (U.S. Census Bureau 2007d).

Table 3-8. Census Year 2000 Total Housing Units, Percent Occupied, and Percent Vacant for Edwards AFB and Across the ROI

Location	Total Housing Units	Occupied (percent)	Vacant (percent)
Edwards AFB	1,783	1,678 (94)	105 (6)
Kern County	231,564	208,652 (90)	22,912 (10)
Los Angeles County	3,270,909	3,133,774 (96)	137,135 (4)
San Bernardino County	601,369	528,594 (88)	72,775 (12)

Sources: U.S. Census Bureau 2000h, 2000i, 2000j, 2000k

3.4.2.4 Schools

There are 76 schools within Edwards AFB and the nearby communities (Greatschools 2009). On Edwards AFB, there are currently two preschools and one elementary school, one middle school, and one high school in operation. They are part of the Muroc Joint Unified School District. Bailey Elementary School is currently vacant and is proposed for renovation and could be used as part of the proposed MQ-1/MQ-9 FTU-2 beddown.

3.4.2.5 Environmental Justice

Between 38 and 51 percent of persons identifying as a single race in the 3-county ROI reported being part of a minority population (i.e., reported a race other than White), and between 38 and 45 percent claimed Hispanic or Latino origin in the census year 2000 (U.S. Census Bureau 2000h, 2000i, and 2000j). Each of the counties in the ROI has a lower minority population than the State of California (Table 3-9). The percentage of poverty across the ROI is greater than in California or the Nation.

Table 3-9. Census Year 2000 Minority Population and Poverty Data for the Nation, California, and the ROI

Location	Minority Population (percent)	All Ages in Poverty, (percent)
United States	12.5	13.3
California	60.5	13.3
Kern County	38.4	20.8
Los Angeles County	51.3	16.2
San Bernardino County	41.1	15

Sources: U.S. Census Bureau 2000h, 2000i, 2000j, 2000k, and 2005b

Across the ROI, the percent of the population that were youth during the 2000 Census is between 28 and 32 percent (Table 3-10). At Edwards AFB, the percentage of youth was higher than across the ROI at 36 percent. The percent of youth across the ROI and on Edwards AFB is higher than the percentage of youth in California (27 percent). Bailey Elementary School area is located near a temporary housing area and is an inactive school. At the North Base and school house area, there are no schools or residences in proximity to the proposed beddown area. The potential for impacts to the health and safety of children would be greater where projects are located near residential areas.

Table 3-10. Census Year 2000 Youth Population Data for California, the ROI, and Edwards AFB

Location	Youth (percent)
California	27.3
Kern County	31.9
Los Angeles County	28
San Bernardino County	32.3
Edwards AFB	36.1

Sources: U.S. Census Bureau 2000g, 2000h, 2000i, 2000j, and 2000k

3.5 Biological Resources

Biological resources are defined as native or naturalized plants and animals and the habitats in which they exist, including threatened and endangered species. Areas at both Holloman AFB and Edwards AFB where the proposed MQ-1/MQ-9 FTU-2 facilities would be located have been previously developed; however, there is some native habitat that still exist where additional or new construction could occur. The following provides a summary of biological resources that occur on or near the project areas.

3.5.1 Holloman AFB

3.5.1.1 Terrestrial Communities

3.5.1.1.1 Vegetation

Holloman AFB lies entirely within the physiographic region known as the Basin and Range Province (USGS 2004), which is centered on the State of Nevada and extends from southern Oregon to western Texas and south into Mexico. Physiographic provinces are geographic

regions with similar geologic and topographic features. The Basin and Range Province is an immense region characterized by north-south-trending, faulted mountains. Due to the arid climate, the Basin and Range Province is occupied by desert biomes (Brown 1994).

Holloman AFB is located in the New Mexico's Tularosa Basin. Most of the Holloman AFB cantonment and flight line areas are previously developed and many of the native plant communities have been replaced by the presence of pavement, buildings and other structures, and landscaping. The areas of native vegetation that surround the base are characterized primarily by shrublands and grasslands of the Chihuahuan desert type.

A map of current vegetation of Holloman AFB was produced by New Mexico Natural Heritage System (NMNHS) for use in the Holloman AFB Integrated Natural Resource Management Plan (INRMP) (Air Force 2000). A total of 25 map units were defined, four of which were predominantly grassland units where shrubs are few and scattered. Eight units were shrub-dominated communities. The remainder of the units represents various miscellaneous land cover type (e.g., exotic woodland, rock, airfield, concrete) (Muldavin et al. 1997). The area surrounding the airfield contains three vegetation types, as described below:

Fourwing Saltbush / Alkali Sacaton Shrubland Predominantly occuring in the central regions of Holloman AFB, this vegetation type is characterized by an open canopy of fourwing saltbush (*Atriplex canescens*) with a well developed grassy understory dominated by alkali sacaton (*Sporobolus airoides*). Tulip and purple pricklypear (*Opuntia phaecantha* and *O. macrantha*), and crucifix thorn (*Koeberlinia spinosa*) are common associates. Scattered inclusions of alkali sacaton grassland can occur in this vegetation type (Muldavin et al. 1997).

Alkali Sacaton Grassland This grassland occurs on the basin bottom flats and is predominantly limited to the southwest sector of Holloman AFB. The grassland is dominated by alkali sacaton but may include scattered fourwing saltbush. It is characterized by scattered bunch grasses with bare soil patches in between (Muldavin et al. 1997).

Fourwing Saltbush Shrubland with Honey Mesquite This open shrubland is dominated by fourwing saltbush along with scattered honey mesquite (*Prosopis glandulosa*). It is primarily found along the southeastern side of Holloman AFB on alluvial flats. The understory is dominated by alkali sacaton and/or scattered burrograss (*Scleropogon brevifolius*) (Muldavin et al. 1997).

3.5.1.1.2 Wildlife

The Tularosa Basin supports a very diverse population of wildlife. Over 280 species of birds are known or have potential to occur on Holloman AFB, comprising year-round residents, seasonal migrants, and transient species (Mesilla Valley Audubon Society 2002). Common species include quail (*Callipepla* spp.), mourning doves (*Zenaida macroura*.), roadrunners (*Geococcyx californianus*), ravens (*Corvus* spp.), black-throated sparrows (*Amphispiza bilineata*), northern mockingbirds (*Mimus polyglottos*), western kingbirds (*Tyrannus verticalis*), cactus wrens (*Camphylorhynchus brunneicapillus*), and a variety of other birds (Mesilla Valley Audubon Society 2002).

Species of raptors that are known to occur on Holloman AFB include the American kestrel *(Falco sparverius*), Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*B. jamaicensis*), and golden eagle (*Aquila chrysaetos*). Turkey vultures (*Cathartes aura*) and owls such as great horned owls (*Bubo virginianaus*) and burrowing owls (*Athene cunicularia*) have also been observed on Holloman AFB (Mesilla Valley Audubon Society 2002). Grebes, herons, ducks,

sandpipers, waders, gulls, and terns, are commonly observed at the wetlands area near the southern boundary of Holloman AFB (U.S. Air Force 2000).

Common mammals inhabiting the Tularosa Basin include the mule deer (*Odocoileus hemionus*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus auduboni*), and American badger (*Taxidea taxus*). Coyotes (*Canis latrans*) and bobcats (*Lynx rufus)* are widespread across most vegetation types. Oryx (*Oryx gazella*), an introduced species from southern Africa, occurs throughout the Tularosa Basin. Rodents are the most abundant mammal found on Holloman AFB. Surveys conducted within habitats at the periphery of the White Sands dune found 14 species of rodents, including Ord's kangaroo rat (*Dipodomys ordii*), desert pocket mouse (*Chaetodipus penicillatus*) and plains pocket mouse (*Perognathus flavescens gypsi*) (U.S. Air Force 2000).

Bats identified on Holloman AFB include the pallid bat (*Antrozous pallidus pallidus*), Mexican free-tailed bat (*Tadarida brasiliensis*), hoary bat (*Lasiurus cinereus*), small-footed myotis (*Myotis ciliolabrum melanorhinus*), California myotis (*Myotis californicus*), Townsend's bigeared bat (*Corynorhinus townsendii*), silver-haired bat (*Lasionycteris noctivagans*), and spotted bat (*Euderma maculatum*) (U.S. Air Force 2000).

Due to New Mexico's many landscapes and varied environment, the state has a diverse assemblage of herpetofauna. The state recognizes 123 species of reptiles and amphibians (Degenhardt et al. 1997). Holloman AFB shares the Tularosa Basin with WSMR; thus, they have many community types in common. WSMR has documented 47 species of reptiles and seven species of amphibians (Burkett 2006).

Reptiles are well adapted to the hot and dry environments surrounding Holloman AFB. Numerous species of lizards are found in the area including horned lizards (*Phrynosoma* spp.), whiptails (*Aspidoscelis* spp.), side-blotched lizards (*Uta stansburiana*), long-nosed leopard lizards (*Gambelia wislizenii*) and southern plateau lizards (*Sceloporus cowlesi*) (Degenhardt et al. 1996).

Common snakes that occur on Holloman AFB include western coachwhips (*Masticophis flagellum*), rattlesnakes (*Crotalus* spp.), gopher snakes (*Pituophis melanoleucus*), and night snakes (*Hypsiglena torquata*). The desert box turtle (*Terrapene ornata*) occupies a wide range of habitats, but is most abundant in grasslands with soils suitable for burrowing (Stebbins 1985). Distribution of amphibian populations in the Tularosa Basin is limited by the lack of surface water. However, three species of true toads, the Great Plains toad (*Bufo cognatus*), the green toad (*Bufo debilis*) and the red-spotted toad (*Bufo punctatus*) as well as three species of spadefoot toads, Couch's spadefoot (*Scaphiopus couchii),* plains spadefoot *(Spea bombifrons*), and Mexican spadefoot (*Spea multiplicata*), inhabit these areas. Spadefoot and true toads retreat underground during periods of aridity, but emerge to reproduce when water collects after rain (Burkett 2000). One salamander, the tiger salamander (*Ambystoma tigrinum*), occurs where permanent and semi-permanent water provides suitable breeding habitat (Burkett 2000).

3.5.1.2 Aquatic Communities

3.5.1.2.1 Fish

The White Sands pupfish (*Cyprinidon tularosa*) is the only endemic fish occurring within the Tularosa Basin, and is highly localized in springs and creeks. On Holloman AFB, the White Sands Pupfish occurs only within the Lost River and tributaries. The Lost River population is distributed in three stream segments, the Malone-Ritas Draw, a trench segment leading to the Lost River Basin, and the dunes segment downstream from the basin. These segments are

connected by water only at times of heavy rains (U.S. Air Force 2000). Other fish have been introduced to Lake Holloman such as mosquito fish (*Gambusia affinis*) (Smith et al. 2003). Game fish, catfish and species as approved by NGDFB are stocked in the golf course pond and in Lake Holloman.

3.5.1.2.2 Wetland and Freshwater Aquatic Communities

The Lake Holloman Wetlands Complex (LHWC) includes Lake Holloman and associated ponds, which were constructed between the 1940s and 1960s; the constructed wetlands adjacent to Lake Holloman were built in 1996. LHWC is the largest area of permanent wetlands in the Tularosa Basin. It provides important habitat for the wildlife on Holloman AFB and for migrating shorebirds, waders, and waterfowl.

Wetland vegetation on Holloman AFB is characterized by nearly pure stands of inland saltgrass (*Distichis spicata*) with occasional, but scattered alkali sacaton. The areas also include seep willow (*Baccharis salicifolia*), smooth seepweed (*Suaeda nigrescens*), pickleweed (*Salicornia virginica*) and sea-lavender (*Limonium latifolium*). Sites are periodically inundated, particularly during the summer rainy season (Muldavin et al. 1997). Saltcedar woodlands once surrounded LHWC and occurred along ditches at the constructed wetland (U.S. Air Force 2000); however, there is an ongoing saltcedar eradication program in place at Holloman AFB and the mature saltcedar trees (*Tamarix* sp.) have been eradicated. There are plans to revegetate the area around LHWC with native cottonwood (*Populus* sp.) and willow (*Salix* sp.) trees (Britton 2009). In 2002, LHWC was officially designated as a New Mexico Important Bird Area by the New Mexico Chapter of the National Audubon Society. LHWC is used by migrating and resident birds and some nesting has been documented at the site. Snowy plover (*Charadrius alexandrinus*), American avocets (*Recurvirostra americana*), snowy egret (*Egretta thula),* black-necked stilts (*Himantopus mexicanus),* killdeer (*Charadrius vociferus*), and white-faced Ibis (*Plegadis chihi*) have been observed nesting at the LHWC (Smith et al. 2003).

In addition, the Boles Wells Water System Annex (BWWSA) consists of three wellfields, which contain 14 wells that provide freshwater for Holloman AFB. The BWWSA is located approximately 15 miles from Holloman AFB near the base of the Sacramento Mountains. The BWWSA is a very important area for bird conservation due to the presence of rare breeding and migrating birds. During a 3-year survey, 71 individual species were observed, 44 species during spring migration, 47 species during summer (breeding season), and 55 species during fall migration (Smith and Johnson 2006).

3.5.1.3 Threatened and Endangered and Special Status Species

The U.S. Fish and Wildlife Service's (USFWS) responsibilities under the Endangered Species Act of 1973 (ESA) include: (1) the identification of threatened and endangered species; (2) the identification of critical habitats for listed species; (3) implementation of research on, and recovery efforts for, these species; and (4) consultation with other Federal agencies concerning measures to avoid harm to listed species.

In addition, the USFWS has identified species that are candidates for listing as a result of identified threats to their continued existence. The candidate designation includes those species for which the USFWS has sufficient information on hand to support proposals to list as endangered or threatened under the ESA. However, proposed rules have not yet been issued because such actions are precluded at present by other listing activity. Candidate species and Species of Concern currently have no legal protection under the ESA. However, they may be protected under other Federal or state laws.

There are five counties in New Mexico within the action area: Otero, Doña Ana, Sierra, Socorro, and Lincoln. The threatened, endangered, and candidate species that potentially occur within the five counties are listed below (Table 3-11). The bald eagle has been delisted but is being monitored for 5 years in all five counties within the action area. One of the listed endangered species is considered as a nonessential experimental population. In addition, one of the threatened species has critical habitat in Otero, Sierra, Socorro, and Lincoln counties (USFWS 2008). One endangered species has critical habitat in Sierra County, and two others have critical habitat in Socorro County (USFWS 2008).

Table 3-11. Federally-Listed Endangered, Threatened and Candidate Species within the Five County Action Area, New Mexico

Common Name	Scientific Name	County	Status
New Mexican meadow jumping mouse	*Zapus hudsonius luteus*	Socorro	C
Bald eagle	*Haliaeetus leucocephalus*	Otero Doña Ana Sierra Socorro Lincoln	DM
Mexican spotted owl	*Strix occidentalis lucida*	Otero Doña Ana Sierra Socorro Lincoln	T
Southwestern willow flycatcher	*Empidonax trailii extimus*	Otero Doña Ana Sierra Socorro	E
Northern aplomado falcon	*Falco femoralis septentrionalis*	Otero Doña Ana Sierra Socorro Lincoln	E, EXPN
Interior least tern	*Sterna antillarum*	Otero Doña Ana Socorro	E
Piping plover	*Charadrius melodus*	Socorro	E, T
Yellow-billed cuckoo	*Coccyzus americanus*	Doña Ana Sierra Socorro	C
Black footed ferret	*Mustela nigripes*	Otero Sierra Socorro Lincoln	E, EXPN
Rio Grande cutthroat trout	*Onocorhynchus clarki virginalis*	Otero Sierra Lincoln	C
Rio Grande silvery minnow	*Hybognathus amarus*	Doña Ana Sierra Socorro	E
Chiricahua leopard frog	*Rana chiricahuensis*	Sierra Socorro	T
Gila trout	*Oncorhynchus gilae*	Sierra	T

Table 3-11, continued

Common Name	Scientific Name	County	Status
Alamosa springsnail	*Tryonia alamosae*	Socorro	E
Chupadera springsnail	*Pyrgulopsis chupaderae*	Socorro	C
Socorro springsnail	*Pyrgulopsis neomexicana*	Socorro	E
Socorro isopod	*Thermosphaeroma thermophilus*	Socorro	E
Pecos sunflower	*Helianthus paradoxus*	Socorro	T
Sneed pincushion cactus	*Coryphantha sneedii var. sneedii*		
Kuenzler's hedgehog cactus	*Echinocerus fendleri var kuenxleri Escobaria (=Coryphantha)*	Otero Lincoln	E
Sacramento prickly poppy	*Argemone pleiacantha ssp. pinnatisecta*	Otero	E
Todsen's pennyroyal	*Hedeoma todsenii*	Otero Sierra	E
Sacramento Mountains thistle	*Cirsium vinaceum*	Otero	T

E= listed endangered, T= listed threatened; C= Candidate species; EXPN = experimental population DM=delisted taxon, recovered, being monitored first five years, PE= proposed endangered experimental population (USFWS 2008).

Critical habitat is a defined in the ESA as a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species that may require special management and protection (USFWS 2005). There is critical habitat for the Mexican spotted owl (*Federal Register* 69:53182) in the Magdalena and San Mateo Mountains of Socorro County, in the Gila National Forest within the Gila Mountains in Sierra County, and in the Carrizo Mountains of Otero County. In addition, there is critical habitat for the Mexican spotted owl high in the Sacramento Mountains of Lincoln and Otero counties, approximately 15 miles east of Holloman AFB (USFWS 2009).

There is also critical habitat for Todsen's pennyroyal (*Federal Register* 50:5730) near the western border of WSMR in Sierra County, approximately 34 miles northwest of Holloman AFB. The designated critical habitat encompasses two, 1-square kilometer parcels on WSMR. The critical habitat units are located in Rhodes Canyon within the San Andres Mountains (USFWS 2009). However, other populations of Todsen's pennyroyal are known to occur on and off WSMR, which are not located within areas designated as Critical habitat.

Critical habitat exists for the Rio Grande silvery minnow in the Middle Rio Grande from Cochiti Reservoir downstream to the Elephant Butte Dam, including the Jemez River from the Jemez Canyon Dam to the confluence of the Rio Grande in Sandoval, Bernalillo, Valencia, and Socorro Counties (*Federal Register* 68:8087). There is also designated critical habitat for the southwestern willow flycatcher within the Rio Grande watershed from its headwaters in southwestern Colorado downstream to the Pecos River confluence in southwestern Texas, which includes parts of Socorro County, New Mexico; however, no flycatcher breeding sites are currently known along the Rio Grande in Texas (USFWS 2002).

3.5.1.3.1 State Listed Species

In 1974 the New Mexico legislature enacted the Wildlife Conservation Act (WCA [17-2-37 to 17-2-46 NMSA (New Mexico Statutes Annotated) 1978]). This act declared that native wildlife

found to be threatened or endangered should be managed to maintain and, to the extent possible, enhance their numbers. The New Mexico Department of Game and Fish (NMDGF) was given the responsibility to enforce the Act. Species are listed as endangered, threatened, or sensitive (Biota Information System of New Mexico [BISON-M] 2006).

As used in the WCA, an endangered species is any species of fish or wildlife whose prospects of survival or recruitment within the state are in jeopardy due to any of the following factors: 1) the present or threatened destruction, modification or curtailment of its habitat; 2) overutilization for scientific, commercial or sporting purposes; 3) the effect of disease or predation; 4) other natural or man-made factors affecting its prospects of survival or recruitment within the state; or 5) any combination of the foregoing factors (BISON-M 2006).

As defined in the WCA a threatened species is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range in New Mexico; the term may also include any species of fish and wildlife appearing on the U.S. list of endangered native and foreign fish and wildlife as set forth in Section 4 of the ESA as threatened species, provided that the commission adopts the list in whole or in part (BISON-M 2006).

Sensitive species are species which, in the opinion of a qualified NMDGF biologist, deserve special consideration in management and planning, and are not listed threatened or endangered by the State of New Mexico. These may include species that are listed threatened, endangered or sensitive by other agencies; species with limited protection; and species without any legal protection. The intent of this category is to alert land managers to the need for caution in management where these taxa may be affected. Where the NMDGF lacks in-house expertise, the opinion of a recognized authority for the species will be used (BISON-M 2006). A list of the endangered, threatened, and sensitive animal species and a list of the New Mexico rare plants that occur in Otero, Doña Ana, Sierra, Socorro, and Lincoln counties are provided in Appendix B.

A cooperative agreement for the management and protection of the White Sands pupfish was signed in 1994 by Holloman AFB, WSMR, White Sands National Monument, USFWS, and NMDGF. The conservation goal of the team is to maintain a viable and genetically appropriate population of the White Sands pupfish in Malone Draw and Lost River as a replicate of the natural population in Salt Creek on WSMR. If feasible, the program should also support additional replicate populations of the White Sands pupfish (U.S. Army et al. 1994).

3.5.2 Edwards AFB

3.5.2.1 Terrestrial Communities

3.5.2.1.1 Vegetation

Edwards AFB lies in southwest portion of the Mojave Desert. The Mojave Desert is located within the intermountain Semidesert and Desert Province and forms its own ecoregion (Bailey 1994). The Mojave Desert ecoregion is bounded by other ecoregions; these include the Great Basin to the north, Apache Highlands to the east, Sierra Nevada and South Coast to the west, and the Sonoran Desert to the south and southeast. The Mojave Desert is situated within the borders of four western states, and extends from southwestern Utah across to southern Nevada to southeastern California, and over to western and northwestern Arizona (Edwards AFB 2002b, Edwards AFB 2008, The Nature Conservancy 2001).

Edwards AFB is described in terms of zonal and azonal communities. Upland zonal plant communities include creosotebush scrub and Joshua tree woodland. Lowland communities

consist of the alkali sink and saltbush communities. The base also supports azonal (isolated) habitats such as claypan, dunes, and mesquite woodlands. The area near the proposed location of the FTU-2 beddown facilities are described as consisting of the following habitats (Figure 3-4):

Playa (North Base area). Playas are large, closed surface water basins that hold water for various periods throughout the year. At Edwards AFB playas retain surface water for several months, which combined with the high salinity of the water, prohibit plant growth. Thus, the playas support little, if any, vegetation communities.

Xerophytic Saltbush (North Base area). This plant community is dominated by allscale (*Atriplex polycarpa*), goldenhead (*Acamptopappus spaerocephalus*) and cheesebush (*Hymenoclea salsola*).

Joshua Tree Woodland (school house area). Joshua tree woodlands are found east of Rogers Dry Lake, and in the northwest portion of the base. Joshua trees (*Yucca brevifolia*) provide an important vertical component for wildlife. This plant association has understories of saltbush (*Atriplex* spp.), creosote bush (*Larrea tridentata*), desert dandelion (*Malacothrix glabrata*), pincushion (*Chaenactis* sp.) and fiddleneck (*Amsinckia tesselata*).

Urban Landscape (Bailey Elementary School). Urban areas are usually populated with non-native invasive species. Certain nonnative invasive plants, such as Russian thistle (*Salsola tragus*), red brome (*Bromus rubens*), tansy mustard (*Descurrania pinnata*), and split grass (*Schismus barbatus*) are common in disturbed portions of natural habitats throughout Edwards AFB. Other nonnative plants include ornamentals planted as landscaping around buildings and other developed areas. Planted species include eucalyptus (*Eucalyptus* spp.) and several species of pine (*Pinus* spp.).

3.5.2.1.2 Wildlife

Extensive wildlife surveys have been completed for Edwards AFB. At least 300 bird species have been observed on-base, mostly at Piute Ponds, comprising year-round residents, seasonal migrants, and transient species (Edwards AFB 2008). Common species include Cooper's hawk (*Accipiter cooperi)*, golden eagle, ferruginous hawk (*Buteo regalis*), peregrine falcon (*Falco peregrinus anatum),* prairie falcon (*Falco mexicanus),* short-eared owl (*Asio flammeus)*, long-eared owl (*A. otus*), burrowing owl, and loggerhead shrike (*Lanius ludovicianus gambelis*).

Thirty mammal species have been documented on Edwards AFB (Edwards AFB 2008). Common herbivore animals observed include the desert cottontail, black-tailed jackrabbit, and the white-tailed antelope squirrel (*Ammospermophius leucurus*). Carnivorous mammals on Edwards AFB include coyote (*Canis latrans*), kit fox (*Vulpues macrotis arsipis*), bobcat (*Lynx rufus*), and American badger. Other common mammals include the spotted bat (*Euderma maculatum)*, Townsend's western big-eared bat (*Plecotus townsendii townsendii)*, the Mohave ground squirrel (*Spermophilus mohavensis).*

Herptofauna common to Edwards AFB include the desert tortoise (*Gopherus agassizii*), chuckwalla (*Sauromalus obesus*), California horned lizard (*Phrynosoma coronatum frontale*), and the Mojave fringe-toed lizard (*Uma scoparia*). At least three species of amphibians have been introduced on Edwards AFB – tree frogs (*Hyla regila*), bullfrogs (*Lithobades catesbeianus*) and African clawed frogs (*Xenopus laevis*) (Edwards AFB 2008). Two native toads occur on Edwards AFB. They are the western toad (*Bufo borealis*) and the red-spotted toad (*B.*

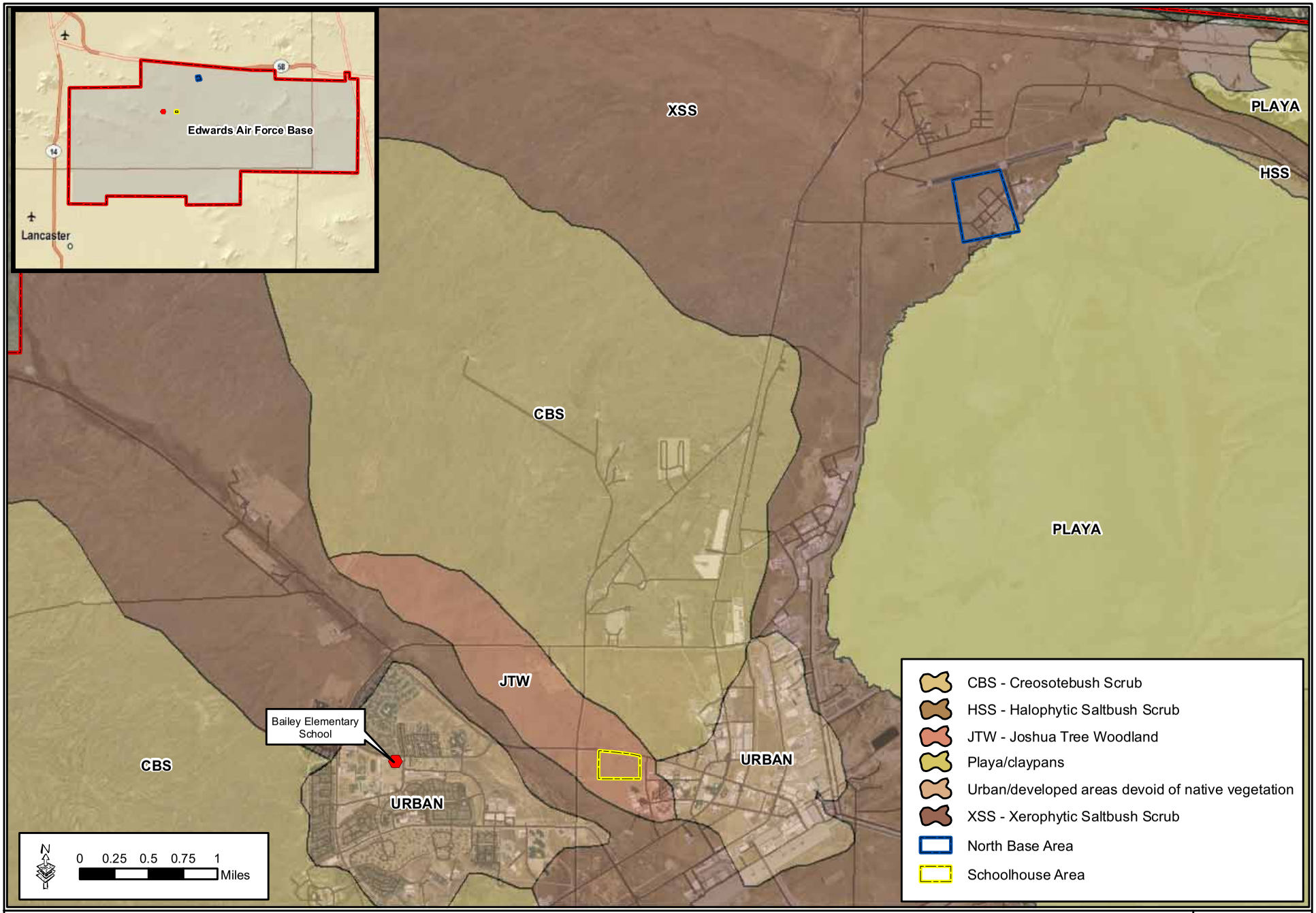

Figure 3-4: Edwards Air Force Base Vegetation Map

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punctatus). However, the tadpoles of both species are prey items of bullfrogs and African clawed frogs, which has threatened the toads' populations (Edwards AFB 2008).

Two surveys for reptiles were conducted on Edwards AFB in the last 15 years. Two seldom seen nocturnal snakes were documented on-base in 2005, the glossy snake (Arizona elegans) and the California night snake (Hypsiglena torquata). Several other Mojave Desert species could occur on-base, but have not been documented. Annual reptile surveys are conducted on-base at established plots to determine population trends. A complete list of reptiles observed on-base can be found in the Edwards AFB 2008 INRMP (Edwards AFB 2008).

3.5.2.2 Aquatic Communities

3.5.2.2.1 Fish

Edwards AFB has never had a native population of fish, although game fish are used to stock the pond at Memorial Branch Park during the Edwards AFB annual fishing derby (Edwards AFB 2008). Fish species approved for fish stocking include bluegill (*Lepomis macrochirus*), rainbow trout (*Oncorhynchus mykiss*), channel catfish (*Ictalurus punctatus*), and largemouth bass (*Micropterus salmoides*) (Edwards AFB 2008).

3.5.2.2.2 Wetland and Freshwater Aquatic Communities

There are no jurisdictional Waters of the U.S. on Edwards AFB, but there is an area in the southern portion of the base that includes natural and man-made water sources used by wildlife. This area includes the Piute Ponds and Branch Memorial Park Pond. The Piute Ponds are fed by effluent from Lancaster Water Reclamation Plants. Waterfowl hunting, bird watching, and other recreational activities take place at the Piute Ponds. Branch Memorial Park Pond was constructed in the late 1960s as a fishpond. Salt cedar, a non-native invasive species, and cottonwood are found around Branch Memorial Park Pond.

3.5.2.3 Threatened and Endangered and Special Status Species

The desert tortoise (*Gopherus agassizii)* and least tern (*Sterna antellarum*) are two Federally protected species that occur at Edwards AFB. The chuckwalla, ferruginous hawk, pallid bat (*Antrozous pallidus*) and loggerhead shrike are listed as sensitive species or species of concern and are known to occur or have the potential to occur at Edwards AFB (Table 3-12).

The desert tortoise, a Federally and state listed threatened species, is a large terrestrial, herbivorous reptile found in portions of the California, Arizona, Nevada, and Utah deserts. In California, desert tortoises occur mainly within creosote, shadscale and Joshua tree habitats of Mojave Desert scrub and the lower Colorado Valley subdivision of Sonora desert scrub. Desert tortoises are most active in California during the spring and early summer when annual plants are not common. Desert tortoises have been documented across Edwards AFB, although none of the sightings have been at any of the proposed MQ-1/MQ-9 FTU-2 beddown sites. Desert tortoises have been documented in the North Base area and the nearest documented desert tortoise sighting is 0.8 mile from the Bailey Elementary School.

The chuckwalla, a Federal species of concern, is rare on Edwards AFB because very little suitable habitat exists. It is an herbivorous lizard and prefers rocky areas, usually containing boulder piles (Edwards AFB 2008).

Table 3-12. Federally-Listed Threatened and Sensitive Species Known to Occur at Edwards AFB, California

Common Name	Scientific Name	Federal Status	State Status	Habitat Preference
Desert tortoise	*Gopherus agassizii*	T	T	Basewide with densities varying by habitat; halophytic-phase saltbush has the lowest density; creosotebush scrub the highest.
Chuckwalla	*Sauromalus obesus*	SS	CS	Associated with rock outcrops. Likely limited to rock outcrops associated with ridges.
Ferruginous hawk	*Buteo regalis*	SS	CS	Migratory, forages in open relatively flat areas on-base in the winter.
Least tern	*Sterna antellarum*	E	T	Migratory bird species found along major tributaries throughout the U.S.
Pallid bat	*Antrozous pallidus*	SC	--	Rocky outcrop areas such as rock crevices, caves and mine tunnels, but they also roost in the attics of houses and abandoned adobe buildings.
Loggerhead shrike	*Lanius ludovicianus gambelis*	SC	CS	Habitat includes roadsides, grasslands, and agricultural fields.

E= listed endangered, T= listed threatened, SC= Species of Concern, SS= Sensitive species, CS = Candidate species
Sources: Edwards AFB 2002 and Edwards AFB 2008

The ferruginous hawk's range is widespread, but uncommon in North America. They are an open-country species that inhabits grasslands, shrub steppe, and deserts in North America. Transient ferruginous hawks have been observed at Edwards AFB perched on telephone poles (Edwards AFB 2008). They are sit-and-wait hunters and their primary prey consist of rabbits, ground squirrels and prairie dogs.

The California and interior subspecies populations of the least tern were Federally listed as endangered in 1970 and 1985, respectively (*Federal Register* 35:16047-16048 and 50:21784-21792). The California subspecies nests from Baja, California to the San Francisco Bay; the interior least tern nests along large tributaries throughout the interior U.S. using sand bars for breeding. The California least tern has been documented on Edwards AFB and is known to use the lakebeds as foraging habitat during periods of inundation (Edwards AFB 2008).

The pallid bat eats off the ground rather than in flight. They eat non-flying beetles, crickets, grasshoppers, lizards, and even scorpions and Jerusalem crickets (BLM 2008). The pallid bat roosts in cliffs, crevices, mine tunnels, caves, house attics, and other man-made structures. The pallid bat occurs in much of western North America from Mexico to Canada. The pallid bat has been observed on Edwards AFB, although the location of the sighting is unknown (Edwards AFB 2008).

The loggerhead shrike is a small predatory bird that occurs in the Mojave Desert but its range is exclusively North America (Edwards AFB 2002). Loggerhead shrike habitat includes semi-open areas (while breeding) and nests in dense trees and shrubs. It is a resident in most of California and has been observed perching on Joshua trees at Edwards AFB. During the winter, the bird has been observed riding on construction equipment, apparently engaging in opportunistic feeding when burrowing lizards are exposed during blading (Edwards AFB 2008).

3.5.2.3.1 Critical Habitat

Critical habitat for the desert tortoise was designated on 8 February 1994 (*Federal Register* 59(26): 5820-5866). The critical habitat is located on the eastern portion of Edwards AFB, and is at least 12 miles from North Base, the schoolhouse area, and Bailey Elementary School.

3.5.2.3.2 State Listed Species

The State of California has enacted the California Endangered Species Act to protect from the "take" of any species that the commission determines to be an endangered or threatened species (California Fish and Game Code; Section 2050 - 2085). Take is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill" (California Fish and Game Code; Section 86). The California Natural Diversity Database (CNDDB) maintains the status and location of all rare species in California.

A search of the CNDDB and Edwards AFB INRMP data indicate that there were occurrences of 17 rare species on or within 1 mile of Edwards AFB (Table 3-13; Figure 3-5), each of which require very specific habitat conditions.

Table 3-13. Sensitive Species Occurrences On and Within 1 Mile of Edwards AFB

Common Name	Scientific Name	Number of Occurrences
Alkali mariposa lily	*Calochortus striatus*	68
Desert cymopterus	*Cymopterus deserticola*	69
Sagebrush loeflingia	*Loeflingia squarrosa* var. *artemisiarum*	9
Burrowing owl	*Athene cunicularia*	63
Le Conte's thrasher	*Toxostoma lecontei*	4
Mohave ground squirrel	*Spermophilus mohavensis*	106
Prairie falcon	*Falco mexicanus*	2
Barstow woolly sunflower	*Eriophyllum mohavense*	22
Red rock poppy	*Eschscholzia minutiflora*	1
Desert tortoise	*Gopherus agassizii*	311
Lancaster milk-vetch	*Astragalus preussii* var. *laxiflorus*	3
Recurved larkspur	*Delphinium recurvatum*	1
Short-eared owl	*Asio flammeus*	1
Tricolored blackbird	*Agelaius tricolor*	4
Western snowy plover	*Charadrius alexandrinus nivosus*	1
White-face ibis	*Plegadis chihi*	1

Sources: CNDDB and Edwards AFB 2002

Desert cymopterus are found in sand fields and sandy washes within saltbush and creosotebush scrubs and Joshua tree woodlands where it shares habitat with the desert tortoise and the Mohave ground squirrel. The desert cymopterus could be found at the school house area location. Burrowing owls use abandoned ground squirrel nests for shelter and either species could also be found at the school house area or at Bailey Elementary School.

The California Native Plant Society maintains an inventory of the state's endangered and rare plant species and nine plant species are listed as having the potential to exist on Edwards AFB. A complete list of these species can be found in the Edwards 2002 INRMP (Edwards AFB 2002). Although some of these plants are not Federally or state protected, consideration is given to identify and protect rare native species within California. None of these species are located at the proposed MQ-1/MQ-9 FTU-2 beddown sites.

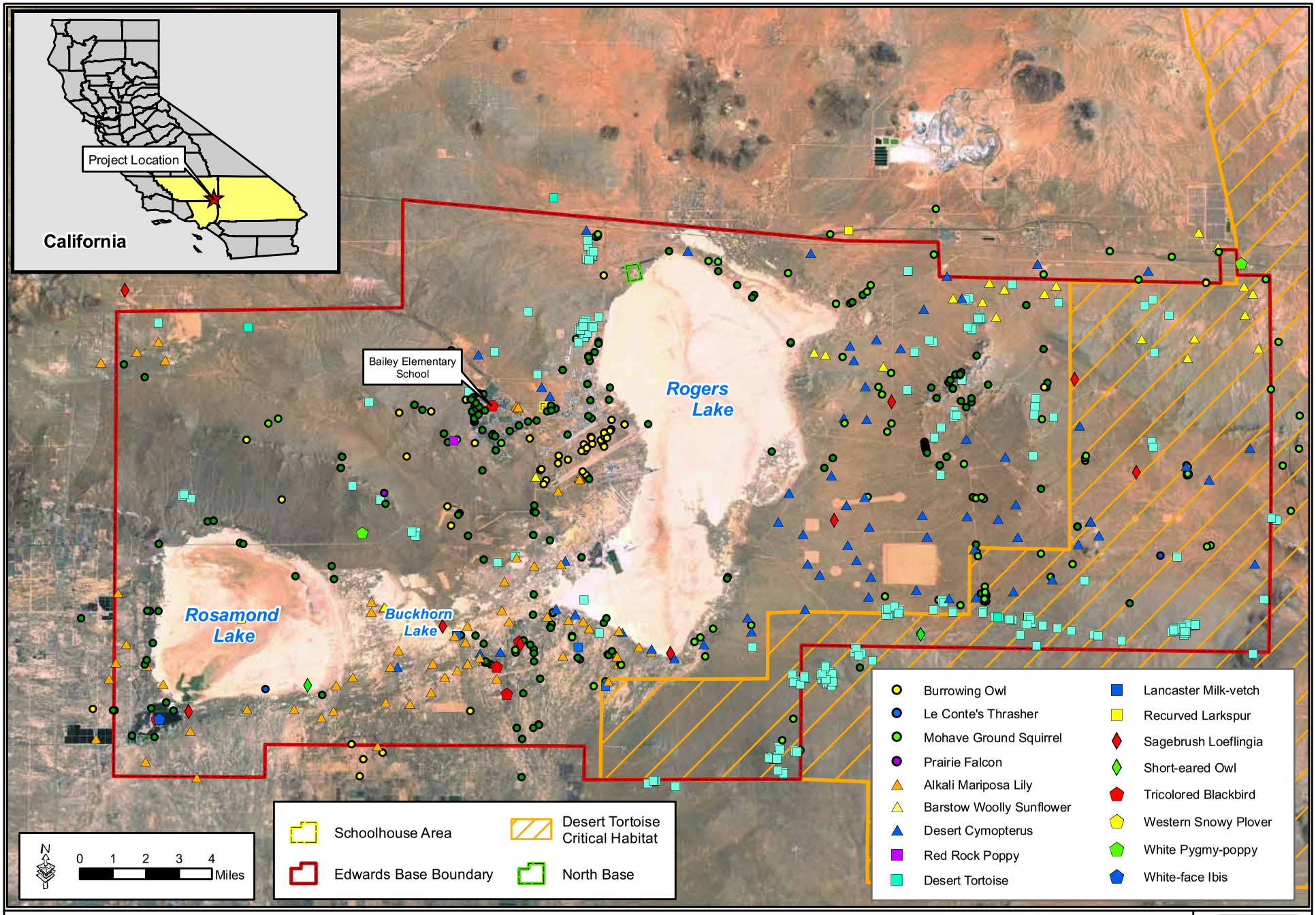

Figure 3-5: Sensitive Species Occurrences on or within 1 mile of Edwards Air Force Base

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3.6 Earth Resources

3.6.1 Holloman AFB

The following information was excerpted from the Holloman AFB INRMP (U.S. Air Force 2000), and Final Programmatic Environmental Assessment for Non-Target UAV Testing on White Sands Missile Range, New Mexico (U.S. Army 2005).

3.6.1.1 Climate

Holloman AFB is located in a semi-arid region within the northern portion of the Chihuahuan Desert. Its climate resembles other semi-arid regions with warm to hot summer days, cool nights, and mild winters. December through March are the coolest months with average temperatures ranging from 41 to 46 degrees Fahrenheit (°F). Freezing temperatures are common from late November through early March. Snowfall averages 4.8 inches annually and occurs primarily between the months of December and February. July is typically the hottest month, with average temperatures of 81 °F and mean maximum temperatures of 93 °F. Daytime temperatures in summer commonly reach 100 °F. In the Tularosa basin, evapotranspiration is usually high due to dry air, large daily solar radiation totals, seasonally high winds, and warm temperatures. Holloman AFB averages 8.58 inches of rainfall annually. Nearly half this amount falls within the months of July through September, known as the summer monsoons. Monsoon thunderstorms are generally short in duration and high in intensity.

Winds are also seasonally variable, occurring at peak speeds in the spring. The highest wind speeds occur from April through July, with median wind speeds of 25 miles per hour (mph). During the month of May, wind velocities are greater than 17 mph approximately 90 percent of the time.

3.6.1.2 Topography and Geomorphology

As mentioned previously, Holloman AFB is located in the Tularosa Basin within the Mexican Highland section of the Basin and Range Province. The principal range defining the western edge of the basin is the San Andres Mountains. The corresponding range defining the eastern edge of the basin is the Sacramento Mountains. The basin landscape is relatively flat, distinguished by dunes, lava flows, gypsum lake deposits, and alkali flats. Gypsum dunes cover the western portion of the base and form the easternmost extent of the white sands.

3.6.1.3 Soils and Geology

The soils on the main base are basin fill deposits formed primarily from alluvial and eolian processes. All soils have a high gypsum and salt content, primarily due to the eastern migration of gypsum sands from WSMR and White Sands National Monument.

The Holloman AFB Main Base has three primary soil types: several associations and complexes of Holloman, Gypsum Land, and Yesum soils, located in the flats; Dune Land, found in the White Sands dunes, and Mead silty clay loam soil, found in the alluvial floodplains (including most jurisdictional wetlands). The Holloman-Gypsum land-Yesum soil complex represents the most common soil type, covering approximately 66.5 percent of the base, specifically the Main Base area (Figure 3-6). None of the soil types are very productive, due to high gypsum and salt content, and all are highly subject to both wind and water erosion when vegetation is sparse or the soil is exposed.

Because of New Mexico's arid climate in agricultural areas, it has been determined that no lands in New Mexico qualify as Prime Farmland unless irrigated with a dependable supply of

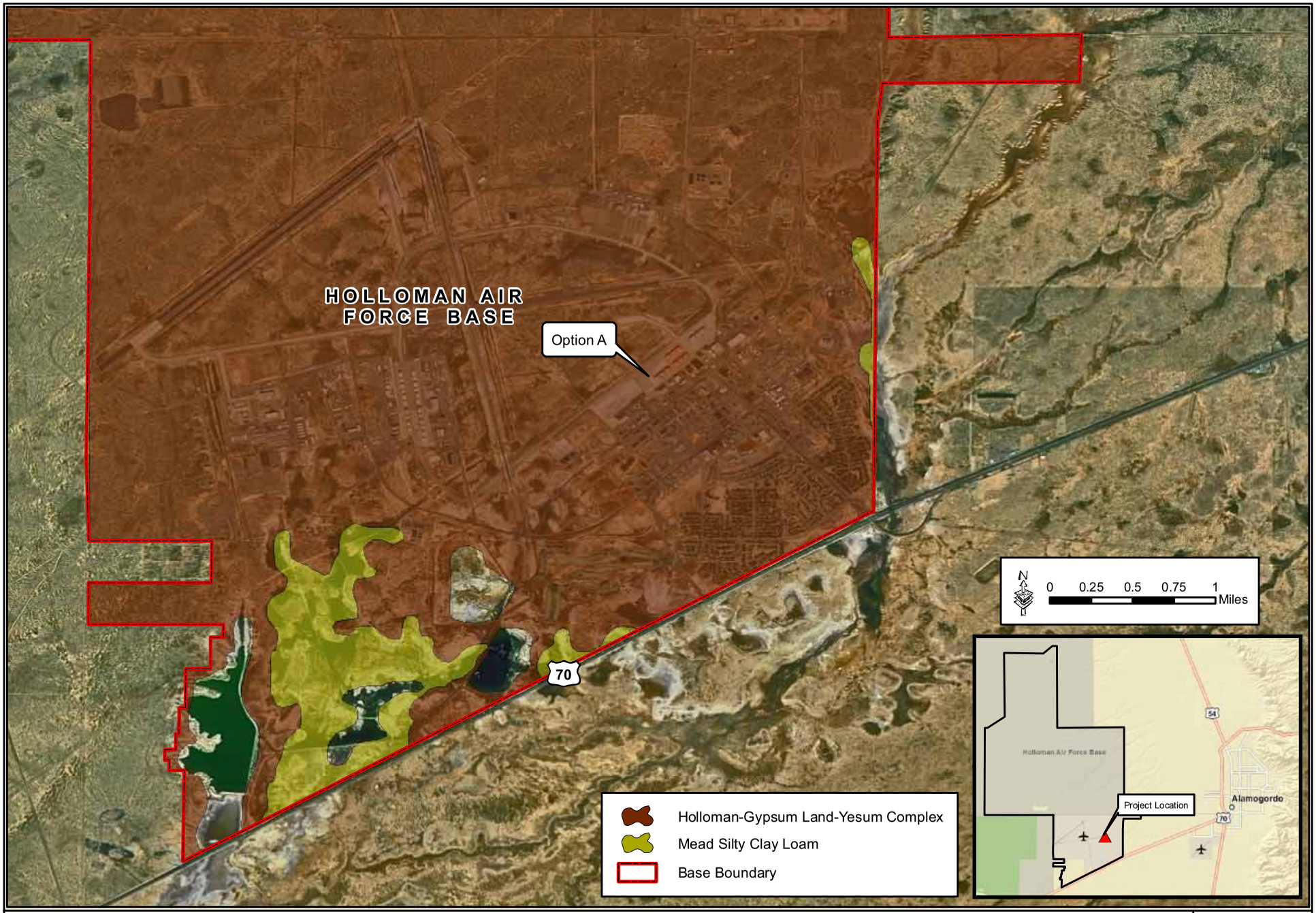

Figure 3-6: Holloman Air Force Base Soil Map

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irrigation water. Thus, no soils at Holloman AFB or WSMR are considered prime farmland (U.S. Department of Agriculture 2009).

Soils of WSMR have formed in alluvial, lacustrine, or eolian parent material, and are broadly distributed. Rocky or skeletal soils are closely associated with mountain landscapes, typically grading into sandy loams, silt loams, and clay loams toward lower elevations. Soils with carbonate horizons are found in older alluvium on piedmont slopes.

Gypsum-bearing soils on the floor of the Tularosa Basin include dunes (e.g., Active dune land, gypsum, and Dune land-Yesum associations) or nearly level gypsum flats (e.g., Gypsum land, level, and Yesum very fine sandy loams). These soil types are highly vulnerable to wind erosion, while water erosion presents less of a hazard. Further upslope, water erosion is a greater hazard in the well-drained calcareous soils (e.g., Mimbres-Glendale, Nickel-Tencee, and Sotim-Russler associations) of alluvial fan deposits. These soils interfinger with Gilland-Rock outcrop and Lozier-Rock outcrop complexes on steeper hillslopes south of the Oscura mountains.

The Tularosa Basin is dominated by soils from alluvial deposits (e.g., Nickel-Tencee, Berino-Doña Ana, Marcial-Ubar, and Onite-Bluepoint-Wink associations) and gypsum-bearing eolian deposits (e.g., Yesum-Holloman association). These soils are susceptible to wind erosion at lower elevations, while water erosion is an increasing hazard upslope.

Various types of soil crusts are found on most soil types within WSMR. Physical crusts, formed from evaporation of water, are frequently observed on soil surfaces. In contrast, microbiotic crusts are formed by soil microorganisms, and usually appear as dark, cohesive surface layers. Soil crusts have an important role in desert landscapes by sealing surface layers and protecting the subsoil from erosion.

3.6.2 Edwards AFB

The following information was excerpted from the Edwards AFB INRMP (Edwards AFB 2002, 2008b).

3.6.2.1 Climate

Edwards AFB has a typical continental desert climate in that the region is semiarid to arid with low humidity and a high evaporation rate. The Western Mojave Desert is sheltered from maritime weather influences by the coastal range to the west and by the San Gabriel Mountains to the south. Winter temperatures can be as low as 3°F, with January and February being the coldest months. Summer maximum temperatures can exceed 110°F, with July being the hottest month. The average annual rainfall for Edwards AFB and the Antelope Valley is 5 inches; however, in the surrounding mountains at elevations of 3,000 feet and higher, there may be as much as 20 inches of rainfall. Ninety percent of the annual precipitation occurs from November through April. The prevailing wind direction throughout the year is west to southwest. The average annual wind speed is 10 mph. High wind speeds are common throughout the year. Atmospheric stability is high, creating conditions that do not support pollution dispersal.

3.6.2.2 Topography and Geomorphology

The topography of Edwards AFB is marked by broad expanses of flat to gently sloping plains interspersed with broad domes and, in a few places, more resistant hills that rise sharply above the surrounding plains. Elevations on base range from 2,267 feet above MSL at Rogers Dry Lake to 3,424 feet above MSL at Red Buttes near the eastern boundary.

3.6.2.3 Soils and Geology

The general geology in the western Mojave Desert region, which includes Edwards AFB, can be grouped into three main divisions: granite and metamorphic rocks of pre-Tertiary age; volcanic, pyroclastic, and sedimentary rocks of Tertiary ages; and alluvial sediments of the Quaternary age. Edwards AFB is located in the Antelope Valley, a broad alluvial plain lying southwest of the Tehachapi Mountains and north of the San Gabriel Mountains.

Approximately 50 soil series have been identified on-base. Soils at Edwards AFB are typically alkaline. The high salinity and exchangeable sodium ion content of some soils, particularly soils in the lakebed basins, inhibit plant growth. In desert soils, a chemical hard pan often forms several inches below the soil surface. This cemented layer is formed from salts and calcium carbonate deposits and is known as caliche.

Soils in the North Base area consist of Helendale loamy sand, Leuhman complex, Norob complex, and Wherry clay. Soils in the proposed school house area are Cajon loamy fine sand. The Bailey Elementary School is located within the Hi Vista-Machone-Randsburg complex (Figure 3-7).

Cajon loamy sands and Helendale loamy sands are soils suitable to irrigated crops. When irrigated these soils meet the requirements of prime farmland (Soil Conservation Service 1986, 1988; California Department of Conservation 2007). Desert soils are generally coarse-textured, light in color, well-drained, and low in organic matter. Except for clay playas, most desert soils are well-drained and are easily eroded. In general, desert soils are low in nutrients, slightly high in dissolved salts and slightly alkaline. The soil surface can contain a macrobiotic crust, and undisturbed soils contain fungi and bacteria that bond with plant roots and function in improving nutrient and water uptake. These surface crusts are fragile and should be managed to reduce disturbance. Recovery from surface disturbance is a long, slow process in the desert. One of the greatest factors in recovery is the presence of mycorrhiza, a fungi, and bacterial interrelationship with plant roots. Many native species require this relationship for seedlings to survive the dry period.

3.7 Water Resources

3.7.1 Holloman AFB

3.7.1.1 Surface Water

Holloman AFB is located within the Tularosa Basin, which is part of the Major Land Resource Area 42 (the Southern Desertic Basins, Plains, and Mountains) and Subresource Area SD-2. These surface water basin groupings are based on a National system that delineates generalized regions sharing recognizable associations of soils, vegetation, hydrology, and other similar land features in southern and central New Mexico (U.S. Air Force 2006). The Tularosa Basin is a closed basin bound on the east and west by the Sacramento and San Andres Mountains, respectively and is fed by ephemeral drainages. Holloman AFB contains several arroyos that flow intermittently and are fed by stormwater runoff (FAA 2006). These arroyos (Figure 3-8) include Lost River, Dillard Draw, Malone Draw and several smaller tributaries (U.S. Air Force 2006).

Holloman AFB relies on surface water and groundwater for potable water. Surface water from Bonito Lake and natural springs located in Fresnal and La Luz Canyons is transported through pipelines to reservoirs at the City of Alamogordo's La Luz water treatment plant. The La Luz water treatment facility transports treated water to the Boles Field Pumping Station

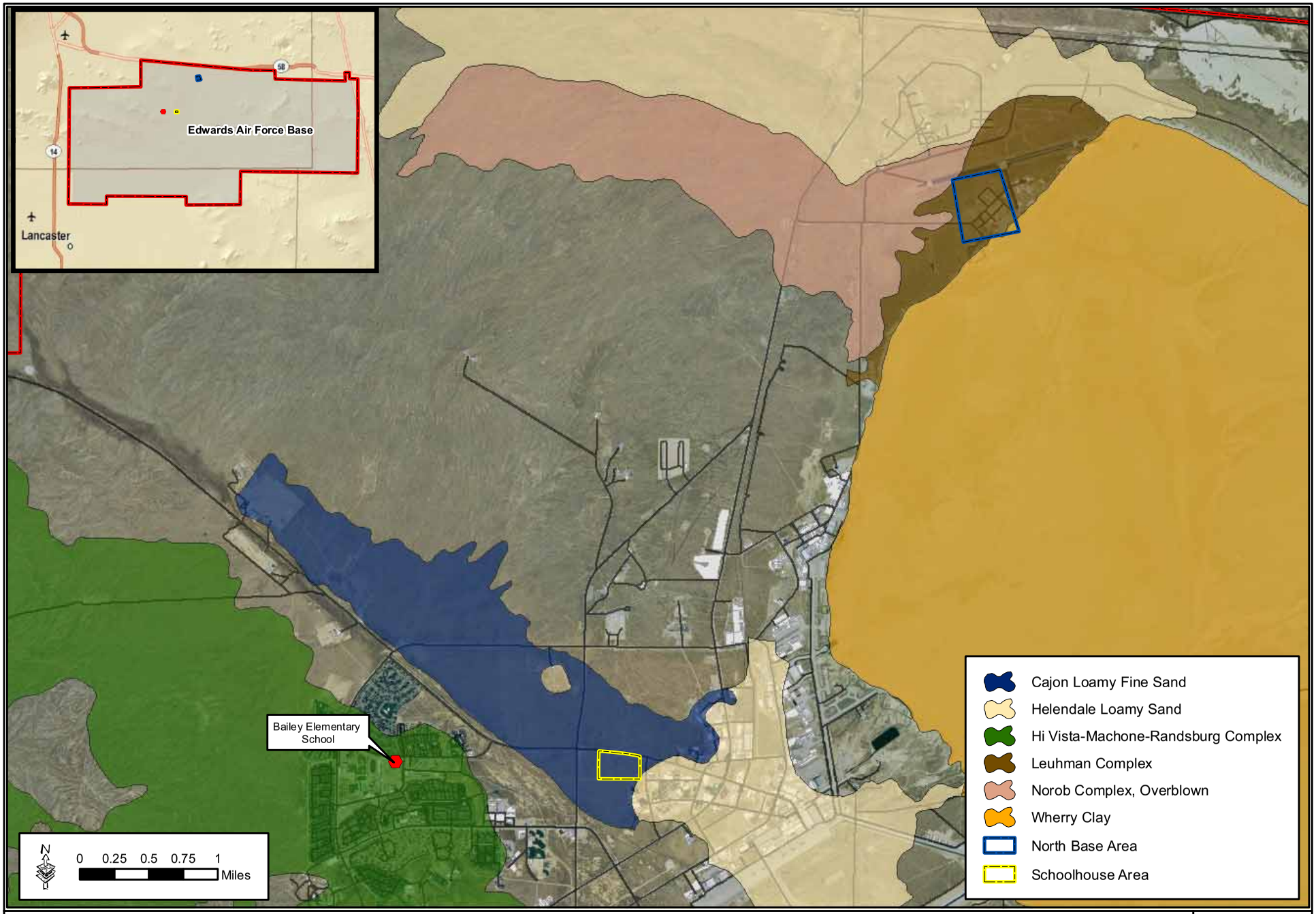

Figure 3-7: Edwards Air Force Base Soil Map

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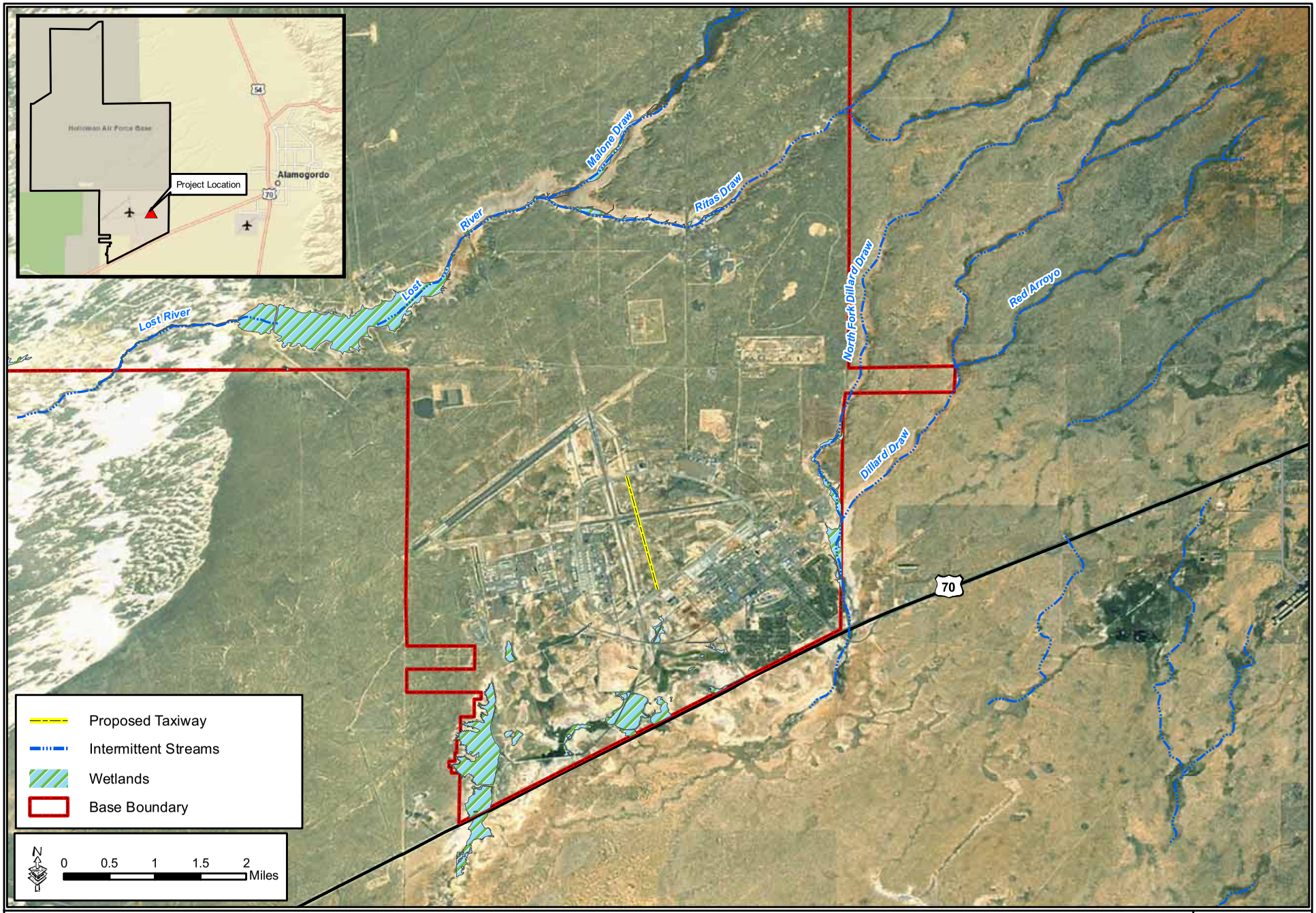

Figure 3-8: Water Resources in the Vicinity of Holloman Air Force Base

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then to the base via pipeline. Three tanks are designated for potable water storage on Holloman AFB, as described previously in Section 3.2.1.2.

None of the arroyos on Holloman AFB have been assessed for water quality standards by New Mexico state agencies (New Mexico Environment Department [NMED] 2008). However, two arroyos within the Tularosa Basin, Dog Canyon and Three Rivers, are listed on the New Mexico Clean Water Act (CWA) 303(d) list of impaired waters. Dog Canyon and Three Rivers arroyos are relatively distant (16 and 11 miles, respectively) from Holloman AFB (NMED 2008).

3.7.1.2 Hydrogeology/Groundwater

The project area is situated above a geological sub-basin feature called the Bolson Aquifer. Groundwater within the Bolson Aquifer is increasingly saline with distance from the mountainous areas toward the basin interior, variably saline with depth below the surface, and classified as non-potable. The only source of potable water is located in perched plumes below the mouths of mountain canyons, and near-to-mountain margins of the major aquifer (U.S. Air Force 2006). Holloman AFB draws groundwater from a total of 15 wells with an average depth of 450 to 550 feet from five wellfields including the Boles, Escondido, San Andreas, Frenchy, and Douglas wellfields. Some of the installation's wells have been installed to depths of 1,000 feet. Groundwater extracted from the well fields is transported via pipeline to two ground level storage tanks with a total capacity of 0.9 MG (U.S. Air Force 2006).

Groundwater under Holloman AFB is not potable due to naturally high total dissolved solids-salts ranging from 10,000 to 45,000 parts per million (ppm), which far exceeds the generally acceptable threshold of 800 ppm. Additionally, there are specific portions of the base that have introduced ground water quality contamination from a variety of sources. Groundwater quality becomes impaired through the introduction of pollutants into the groundwater from chemical spills, stormwater runoff, septic and underground storage tank leakage, agricultural runoff, industrial point sources, and the introduction of contaminated sediment. Liquid hydrocarbons were reported to have contaminated some soil and groundwater beneath portions of Holloman AFB. The source of hydrocarbon contamination is believed to be from fuel spillage, seepage from a munitions disposal pit, and/or leakage from an underground heating oil tank, which is no longer in service. Remedial actions have been completed for select sites, and efforts are ongoing to clean up and monitor the remaining sites. Clean up/remediation is expected to be completed or reduced to monitoring status within the next 10 years, depending on funding.

3.7.1.3 Floodplains

EO 11988 (*Floodplain Management*) directs Federal agencies to avoid developments within floodplains. Pursuant to the National Flood Insurance Act of 1968, as amended (42 USC 4001 et seq.), and the Flood Disaster Protection Act of 1973 (P.L. 93-234, 87 Stat. 975), EO 11988, floodplain management requires that each Federal agency take actions to reduce the risk of flood loss, minimize the impact of floods on human safety, health and welfare, and preserve the beneficial values which floodplains serve. EO 11988 requires that agencies evaluate the potential effects of actions within a floodplain and avoid floodplains unless the agency determines that there is no practicable alternative. Where the only practicable alternative is to site in a floodplain, a planning process is followed to ensure compliance with EO 11988. In summary, this process includes the following steps:

1. Determine whether or not the action is in the regulatory floodplain.
2. Conduct early public notice.
3. Identify and evaluate practicable alternatives, if any.

4. Identify impacts of the action.
5. Minimize the impacts.
6. Reevaluate alternatives.
7. Present the findings and a public explanation.
8. Implement the action.

Typically, issues relevant to water resources include the quality and quantity of downstream water bodies that could be affected and hazards associated with the 100-year floodplains. Elevated water levels within ephemeral stream channels near Holloman AFB generally occur between June and October and are characterized by high peak flows with small volumes that are short-lived. Most of the water that flows through these stream channels evaporates, while a small percentage contributes to groundwater recharge (FAA 2007). Dillard Draw is located near the southeast portion of the base and is associated with the 100-year floodplain. However, the proposed beddown area is not located within the 100-year floodplain (Figure 3-9).

3.7.2 Edwards AFB

3.7.2.1 Surface Water

Edwards AFB is located in the Antelope Valley, a closed drainage basin of the Mojave Desert which receives runoff from the western San Gabriel Mountains, southern Sierra Nevada Range, and a portion of the Government Peak region to the north and west (Edwards AFB 2002a).

Stormwater runoff from the Antelope Valley is directed toward three central dry lake beds (Rogers, Rosamond, and Buckhorn) on Edwards AFB. Though much of the stormwater moving within drainage channels evaporates en route to the lake beds, any water reaching these playa lakes remains until it evaporates. Stormwater runoff from developed portions of the base is conveyed to industrial evaporation ponds to prevent contamination of Rogers Dry Lake (U.S. Geological Survey [USGS] 2002). No potable water is derived directly from the above playa lake beds for use by Edwards AFB activities. Major streams in the drainage area include Big Rock Creek, Mojave Creek, Little Rock Creek, Anaverde Creek, Amargosa Creek, Portal Ridge Wash, and Fairmont Wash (Figure 3-10). None of these water courses are perennial (Edwards AFB 2002a), and none are listed in the California CWA 303(d) attainment list for water quality limited segments (California Environmental Protection Agency [CalEPA] 2002).

3.7.2.2 Hydrogeology/Groundwater

The Antelope Valley groundwater basin underlying Edwards AFB is composed of two groundwater subbasins, the Lancaster subbasin and the North Muroc subbasin. The Lancaster subbasin underlies most of the Main Base and South Base areas, while the North Muroc subbasin underlies the North Base area. The Lancaster subbasin is divided into two aquifers--an unconfined principal aquifer (beginning at approximately 35 to 95 feet bgs), and a partly confined, deep aquifer (beginning at approximately 70 to 200 feet bgs). The two aquifers are separated by low-permeability sediment deposits of locally variable thickness. The aquifer in the North Muroc subbasin (beginning at approximately 95 to 130 feet bgs) is unconfined (USGS 1992).

The primary source of potable water to serve Edwards AFB is derived from groundwater sources via well pumping stations. The remainder of potable water, mostly targeted for use by the North Base, is purchased from the AVEK, as described previously in Section 3.2.2.2. The principal source of recharge to the Lancaster subbasin is infiltration of rainfall and runoff through the alluvial fans of Big Rock, Little Rock, and Amargosa Creeks (south of Edwards AFB, at the base of the San Gabriel Mountains). Recharge to the North Muroc subbasin prior to development of the valley occurred as groundwater flow generated from the Lancaster

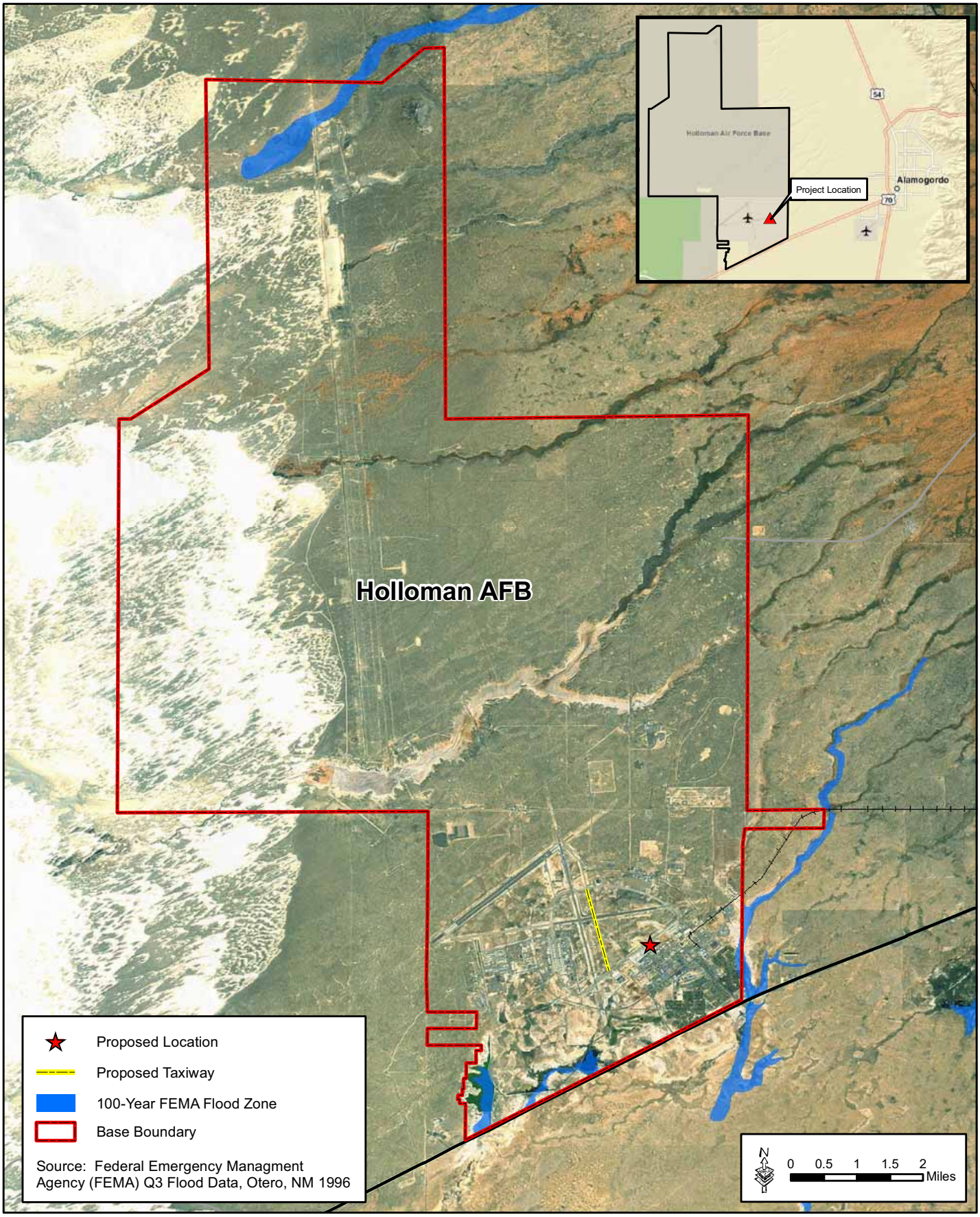

Figure: 3-9: Holloman Air Force Base FEMA Floodplain Map

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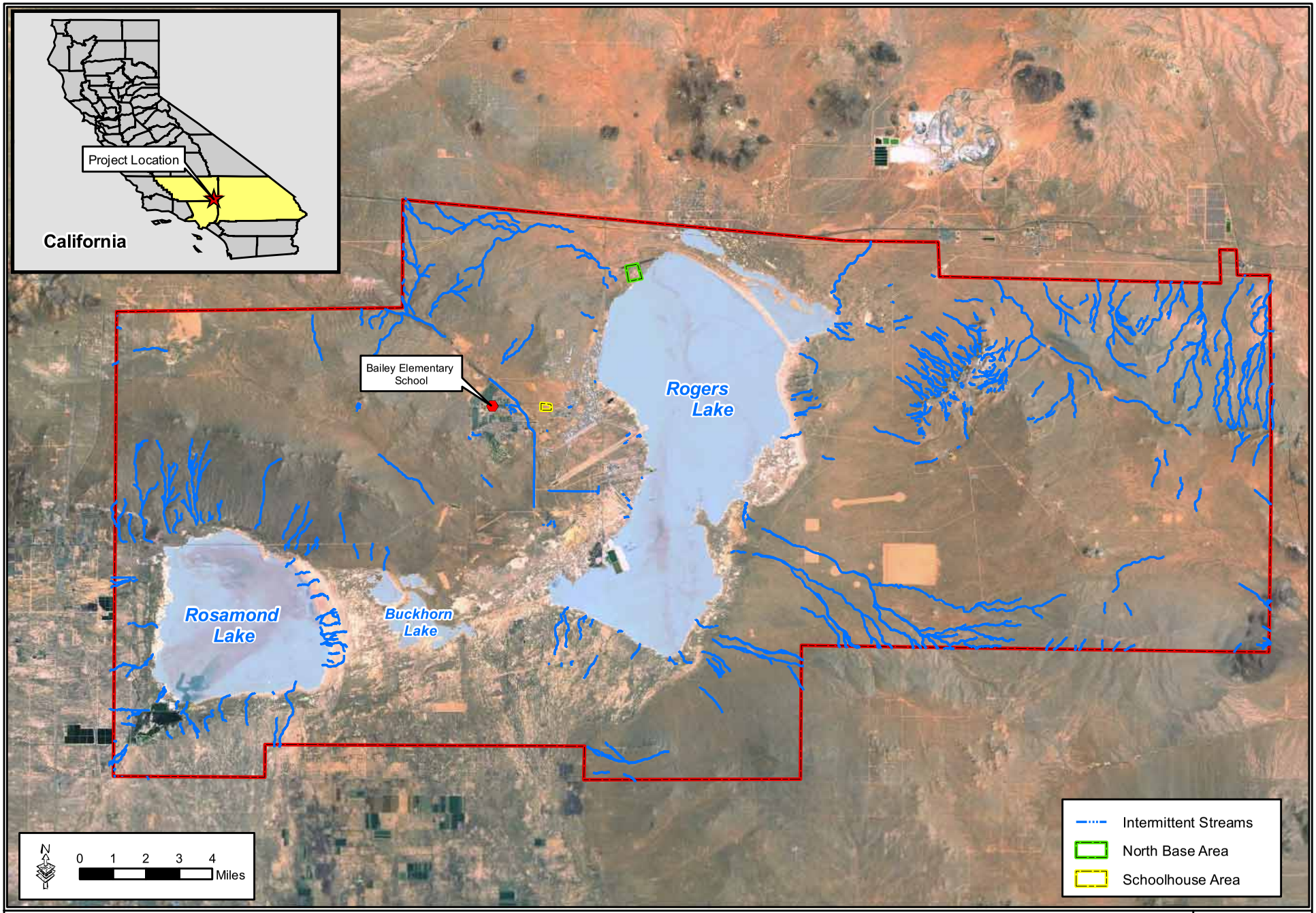

Figure 3-10: Water Resources in the Vicinity of Edwards Air Force Base

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subbasin. As the valley has become populated, groundwater levels have declined in the Lancaster subbasin to the point that groundwater no longer flows from it into the North Muroc subbasin. There is a groundwater divide, oriented east-west across the north-central part of Rogers Dry Lakebed, which hydraulically separates the North Muroc subbasin and the Lancaster subbasin. Recharge to the subbasins from infiltration in the bedrock hills on the eastern and northwestern parts of Edwards AFB is minimal. Some recharge within the valley from storm runoff has been observed, but infiltration is limited by low permeability sediments near the ground surface (USGS 1992).

As mentioned previously, the drinking water supply wells at Edwards AFB include eight potable wells (built between 1951 and 1994) that supply the Main Base area (Table 3-14). These wells draw water from the deep aquifer of the Lancaster subbasin at screen intervals ranging from 216 to 833 ft bgs. The North Base supply system previously consisted of one well, N-2, that was installed in 1964 (drawing water from the unconfined aquifer of the North Muroc subbasin) but was taken off line in 1995 due to elevated arsenic concentrations. Water purchased from AVEK has replaced the water formerly provided by the contaminated N-2 well. The water then flows into two storage tanks for subsequent distribution throughout the base. AVEK water can be, and often is, mixed with Edwards AFB groundwater to provide additional water to the Main Base area (Edwards AFB 1999 and 2002).

Table 3-14. Description of On-base Drinking Water Supply System

Drinking Water Source	Dates of Use	Screen Interval (Feet Below Ground Surface)
AVEK Water District supplies North Base, Main Base, AFRL		
AVEK	1993-present	N/A
South Base wells supply Main Base and South Base areas		
Well S-2	1951-present	750
Well S-3	1974-present	220-590
Well S-4	1974-present	216-662
Well S-5	1974-present	223-665
Well S-6	1984-present	300-690
Well S-7	1990-present	290-690
Well NST-1	1994-present	583-833
Well NST-2	1994-present	525-775
Former North Base well supplied North Base areas		
Well N-2 (no longer in use)	1964-1995	N/A
Air Force Research Laboratory (AFRL) wells supply AFRL		
Well A	1964-present	520
Well B	1964-present	482
Well C	1964-present	525
Well D	1964-present	505

Source: Department of Health and Human Services (DHHS 2003).

The AFRL on Edwards AFB receives its water supply from four groundwater wells (built in 1964) that also draw water from the deep aquifer of the Lancaster subbasin (see Table 3-14). Water from these wells is treated (through addition of chlorine) at AFRL before being distributed (Edwards AFB 2002). AFRL also receives water through the base-wide AVEK distribution (Edwards AFB 1999).

As a result of past practices at Edwards AFB, contamination has been released to groundwater at hundreds of Environmental Restoration Program (ERP) sites throughout the base. Through site investigations and sampling, Edwards AFB has discovered and characterized 29 contaminant groundwater plumes that contain a variety of volatile organic compounds (VOC) and semi-volatile organic compounds (SVOC) within the groundwater below the base. Although Edwards AFB ERP investigations have observed the above organic compounds in groundwater throughout the base, contaminant plumes are located between 2.5 and 15 miles from any actively used drinking water supply wells and have not migrated to on-base or to off-base drinking water supply wells. The Agency for Toxic Substances and Disease Registry (ATSDR) evaluated groundwater sampling data for both on-base and off-base private and public drinking water wells (DHHS 2003).

The ASTDR conclusion was that drinking water supplies are safe, based on the determination that no humans have been exposed to contaminants via drinking water supplied by Edwards AFB drinking water supply systems, off-base community supply systems, or off-base private wells. The groundwater contamination at Edwards AFB is, therefore, not a public health hazard, and remediation and monitoring programs are in place to ensure that it does not become a future hazard (DHHS 2003).

3.7.2.3 Floodplains

Three types of flooding occur at Edwards AFB - flooding associated with channels, shallow flooding, and inundation caused by ponding (USGS 2002). Each hydrogeographic type of flooding associated with floodplains is described below. Flood-hazard analysis and the development of relatively reliable 100-year floodplain maps are difficult at Edwards AFB due to a lack of historical streamflow and precipitation data. Channel characteristics, which are needed for flood-hazard analysis, have not been determined for this area because of the poorly defined channels, uncertain flow paths, and the extreme aridity that causes most flow paths to be nearly always dry (USGS 2002). As shown in Figure 3-11, the 100-year floodplain is not located near the area to be affected by the proposed MQ-1/MQ-9 FTU-2 beddown.

According to a study conducted by the USGS in 2002, stream channels and water courses on Edwards AFB have for the most part not been disturbed by human activity. Arid environments, if undisturbed by human activity, preserve erosional and depositional features for many years. Since 1983, only two storms, one in March 1983 and another in February 1998, have generated enough rainfall (3.38 inches and 2.39 inches of daily rainfall) to be classified as 50 to 100-year storms.

3.7.2.3.1 Channels

Natural ephemeral channels at Edwards AFB, with drainage areas of greater than a few square miles, have very low channel gradients. These channels have vague channel definitions, no definable banks, and channel bottoms consisting of unconsolidated sand. There is no evidence of recent sediment transport in the channels. Some of the ephemeral channels that have been disturbed by human activity, exclusive of constructed ditches, exhibit evidence of flow occurring within the last decade. Runoff from roads, old mining areas, and other developed areas has increased because of the localized disturbance or compaction of the desert soils.

During storms, runoff often is concentrated and follows an artificial route to a low point where it enters a channel. Because the channels at Edwards AFB are losing reaches and because precipitation is minimal, discharges greater than 10 cubic feet per second (ft^3/s) seldom occur (USGS 2002).

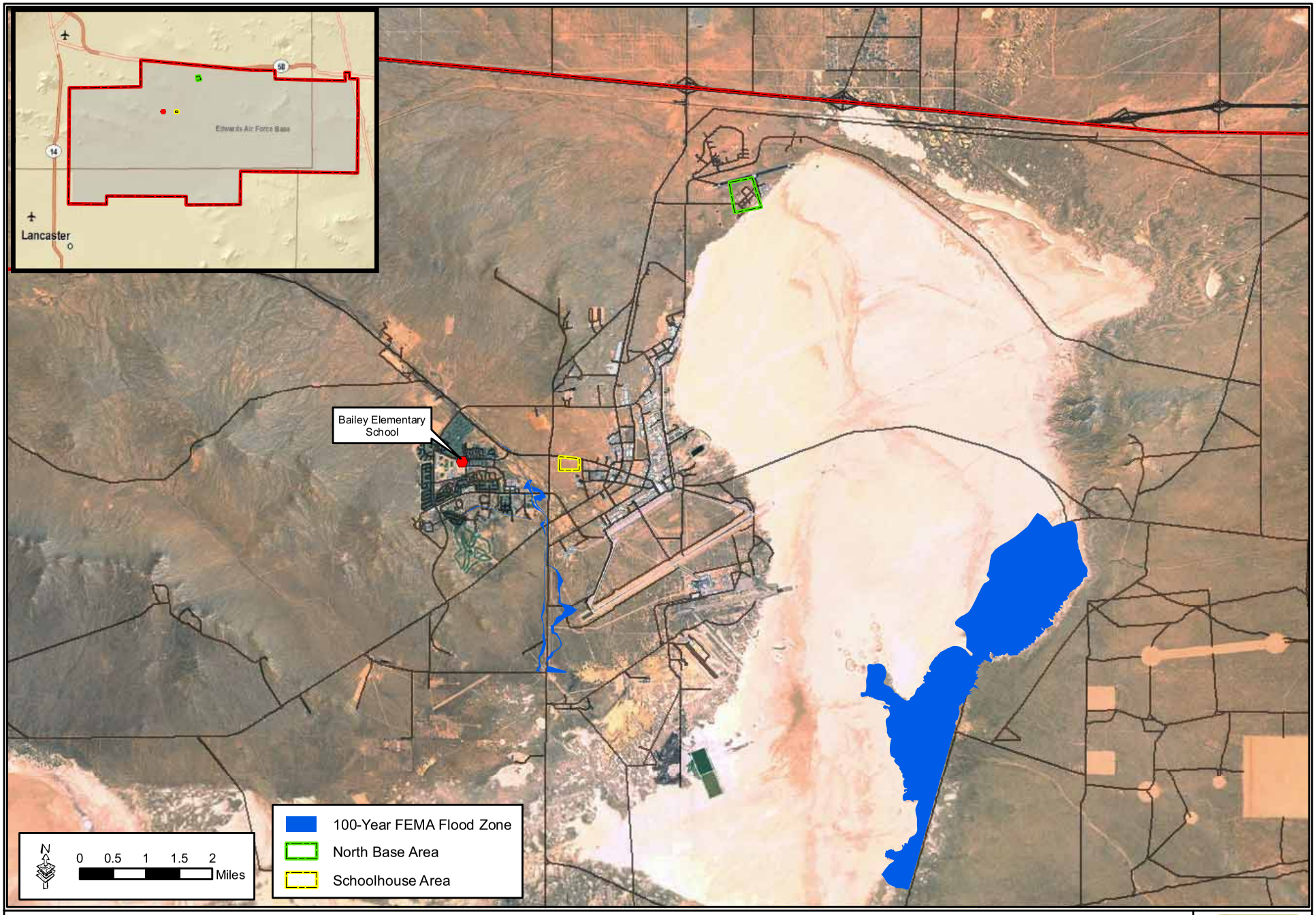

Figure 3-11: Edwards Air Force Base FEMA Floodplain Map

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Mojave Creek, on the other hand, is a relatively well-defined drainage course that connects the approximately 200-square-mile Mojave-Soledad Mountain Drainage Area to Rogers Dry Lake. The drainage channel extends through residential areas and parallels Lancaster Boulevard south of the intersection with Rosamond Boulevard. Unlike flooding in the dry lakebeds, flooding along Mojave Creek is not a seasonal occurrence. Usually the channel is dry. However, the creek causes periodic flooding during high-intensity storms. Hydraulic modeling reveals that if a 100-year event occurs, Mojave Creek would breach and cause flooding in the residential area near the intersection of Mojave Boulevard and Forbes Avenue (DHHS 2003).

3.7.2.3.2 Shallow Flooding

Shallow flooding occurs in flood-prone areas that have uncertain flow paths. Such flooding includes unconfined flows across broad, fairly low relief areas. At Edwards AFB, most of the flows that result in shallow flooding originate in disturbed areas of the base and collect along the roadways or come from alluvial fans originating in the San Gabriel Mountains. As previously stated, because flow paths, discharge, and drainage areas have not been characterized, hydraulic analysis is not possible for Edwards AFB and, thus, the ability to accurately delineate areas subject to shallow flooding is limited (USGS 2002).

3.7.2.3.3 Inundation of Playa Lakes

The largest areas of flooding on Edwards AFB are caused by the inundation of the playa lakes by ponded water. Rogers, Rosamond, and Buckhorn Lakes, which are dry lakes, are subject to inundation from runoff and from direct rainfall (USGS 2002). Rogers Dry Lake floods most winters, and the drainage pattern is toward the southern end of the lake. Once flooded, the lakebed tends to remain inundated the rest of the winter due to the low permeability of the lakebed soils. Although existing base facilities need to be protected from flooding, a 1993 flood study noted that occasional moderate flooding is necessary to replenish and smooth the playa surface (Edwards AFB 2002a).

3.8 Air Quality

Regulatory Setting

The U.S. Environmental Protection Agency (USEPA) established National Ambient Air Quality Standards (NAAQS) for specific pollutants. The NAAQS standards are classified as either "primary" or "secondary" standards. The major pollutants of concern, or criteria pollutants, are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), Particulate Matter (PM-10), and lead (Pb). NAAQS represent the maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect the public health and welfare. The New Mexico Air Quality Bureau (AQB) and California Air Resources Board (CARB) adopted similar, although more stringent, Ambient Air Quality Standards (NMAAQS and CAAQS).

Areas that do not meet these NAAQS or state standards are called non-attainment areas or maintenance areas; areas that meet both primary and secondary standards are known as attainment areas. The Federal Conformity Final Rule (40 CFR Parts 51 and 93) specifies criteria or requirements for conformity determinations for Federal projects. The rule mandates that a conformity analysis must be performed when a Federal action generates air pollutants in a region that has been designated a non-attainment or maintenance area for one or more NAAQS. A conformity analysis is the process used to determine whether a Federal action meets the requirements of the general conformity rule. It requires the responsible Federal agency to evaluate the nature of the proposed action and associated air pollutant emissions, calculate

missions as a result of the proposed action, and mitigate emissions if *de minimis* thresholds are exceeded.

3.8.1 Holloman AFB

Otero County is in attainment for all Federal NAAQS and state NMAAQS.

3.8.2 Edwards AFB

State and Federal air basins in California are not similar; the Federal government divides air basins by county lines and California air basins are divided into geographic areas that share similar climatic conditions. There are currently 15 state air basins and 58 Federal county air sheds. Kern County is divided by two air basins, San Joaquin Valley on the west and Mojave Desert air basin on the east. Edwards AFB is located in the Mojave Desert air basin, but Edwards AFB's air space is located in three air basins: Mojave Desert, San Joaquin, and the San Bernardino air basins. These three California air basins are in serious non-attainment for 1 hour O_3 and PM-10 and are in moderate non-attainment for PM-2.5. Federal air districts are segregated by counties and Kern County is in serious non-attainment for 8 hour O_3 and PM-10.

3.9 Solid and Hazardous Materials and Waste

3.9.1 Holloman AFB

There is an existing Installation Restoration Program (IRP) site located on the north side of the runway, approximately 1,000 feet northwest of the nearest building renovation proposed at Holloman AFB for the MQ-1/MQ-9 FTU-2 beddown. The site is the location of the former T-38 test site, and is the result of a spill of JP-4 jet fuel on soils. Remediation is underway with contaminated soil removal and soil vapor extraction (SVE); however, the contamination plume did not extend to the runway or to any areas proposed for use as part of the proposed MQ-1/MQ-9 FTU-2 beddown.

Existing storage tanks and capacity for JP-8 would be used for the Holloman AFB site, and these tanks are currently operated under a Spill Prevention, Control and Countermeasures Plan (SPCCP) in place for the base. Hazardous materials and waste used and generated at Holloman AFB are currently managed under existing management procedures and best management practices (BMPs), which are sufficient to prevent any significant impact on the environment at the base or any significant impact on the general public.

3.9.2 Edwards AFB

There are no current IRP sites near the alternative beddown site at Edwards AFB. Existing hazardous materials and waste management procedures and BMPs are used at Edwards AFB to prevent any significant impact on the environment at the base or any significant impact on the general public.

3.10 Safety and Occupational Health

Air Force host and tenant safety offices are responsible for implementing the Air Force Safety Program. The host safety office implements mishap prevention programs and processes for all Air Force units and programs on-base unless otherwise outlined in a Host/Tenant Support Agreement. Safety staffs at all levels assist with implementation and integration of operational risk management into all Air Force operations and missions. Commanders, functional managers, supervisors, and individuals, with the host safety office's help, identify rules, criteria, procedures, Occupational Safety and Health Administration (OSHA), Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH), explosive safety, or other

safety standards that could help eliminate unsafe acts or conditions that cause mishaps (Air Force Instruction 91-202). Detailed standard operating procedures (SOPs) have been established to fulfill many health and safety requirements. Personnel involved with different test equipment are instructed on the use of the equipment and personal protection equipment (PPE).

The primary safety issue associated with military flight operations is the potential for aircraft mishaps. Aircraft mishaps may involve mid-air collisions with other aircraft, collisions with objects on the surface (e.g., towers or buildings), weather-related accidents, and bird-aircraft collisions. Data commonly used to describe aircraft safety and accident potential include mishap rates per 100,000 flying hours for each aircraft type, years between major mishaps (predicted by comparing the mishap rate with the proposed number of hours to be flown annually), and the Bird Aircraft Strike Hazard (BASH).

The U.S. Air Force identifies categories of mishaps. Class A mishaps are those which result in a human fatality or permanent total disability, the destruction of an aircraft, or a total cost in excess of $1 million for injury, occupational illness, or destruction of an aircraft. Class B mishaps are those which result in a permanent partial disability, inpatient hospitalization of three or more personnel, or a total cost in excess of $200,000 but less than $1 million for injury, occupational illness, and property damage. Class C mishaps are those which result in total damage in excess of $20,000 but less than $200,000; an injury resulting in a lost workday (i.e., duration of absence is at least eight hours beyond the day or shift during which the mishap occurred); or occupational illness that causes loss of time from work at any time.

Daily operations and maintenance activities are performed in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by AFOSH requirements. Detailed SOPs have been established to fulfill health and safety requirements.

The National range system, established by Public Law (P.L.) 81-60, was originally sited based on two primary concerns: location and public safety. Thus, range safety, in the context of National range activities, is rooted in P.L. 81-60 and DoD Directive 3200.11*, Use Management*, and *Operation of Department of Defense Major Range and Test Facilities*. Both provide the framework under which the National ranges operate and provide services to range users. To provide for the public safety, the ranges using a Range Safety Program, ensure that the weapons delivery testing presents no greater risk to the general public than that imposed by overflight of conventional aircraft. Range safety requirements apply to UASs just like any other aircraft.

The primary public concern with regard to flight safety is the potential for aircraft accidents. Such mishaps may occur as a result of mid-air collisions, collisions with manmade structures or terrain, weather related accidents, mechanical failure, pilot error, or bird-aircraft collisions. Flight safety considerations addressed include aircraft mishaps and bird-aircraft strikes.

Based on historical data on mishaps at all installations, and under all conditions of flight, the military services calculate Class A mishap rates per 100,000 flying hours for each type of aircraft in the inventory. Class A mishaps are focused on because only they have the potential to cause significant environmental damage. In evaluating this information, it should be emphasized that those data presented are only statistically predictive. The actual causes of mishaps are due to many factors, not simply the amount of flying time of the aircraft. AFI 91-

202 establishes mishap prevention program requirements and assigns responsibilities for program elements.

The use of UASs in military operations is expanding rapidly. Pilots of UASs such as the MQ-1 and MQ-9 are assuming rapidly expanding roles in military operations to provide intelligence, surveillance and reconnaissance/target acquisition assets, and more recently strike assets. Annual flying hours increased from under 3,000 in 1997 to just under 80,000 in 2007. Increased use has been accompanied by increased mishaps (Herz 2008). A total of 64 MQ-1 mishaps including 27 Class A, 3 Class B, and 34 Class C mishaps occurred from the introduction of this system into operational Air Force inventory in 1997 through the end of FY 2006. MQ-1 Class A mishap rates are currently at 31 per 100,000 hours of flight time, a rate far higher then manned aircraft (Herz 2008). During recent years (2004 to 2006), the majority (80 percent) of MQ-1 crashes were considered the result of human factors such as pilot skill and breakdowns in crew teamwork, as opposed to mechanical error (Herz 2008). Only 33 percent of MQ-1 mishaps during this time occurred during training activities at a U.S. installation; the rest occurred at a deployed locations (U.S. Air Force 2007 cited in Air National Guard 2008). During FY 2006 there were 3 Class A MQ-1 mishaps during training missions in the U.S. Two were the result of pilot error and one was an equipment design problem. During FY 2007 and 2008 there was a total of 12 Class A MQ-1 mishaps; all at deployed locations. Mishap reports are available at http://usaf.aib.law.af.mil/. Mishap frequencies have steadily increased over time with increased flight hours, while MQ-1 Class A mishap rates per 100,000 flying hours have decreased substantially over time, from 23 per 100,000 flying hours from FY 1997 to 2003 to less than 10 in FY 2004 to 2006. Class A mishaps are centered in the enroute phase of the mission more than two thirds of the time, with the landing phase a close second. Class B and C mishaps are centered in the landing phase (Herz 2008). It is anticipated that there could be one Class A mishap per year during training operations at the beddown location (Lt. Colonel Merchant, pers. comm. November 2008).

The short history of the MQ-9 precludes calculation of meaningful mishap statistics, but would be anticipated to be similar to the MQ-1 aircraft. In 2006 the MQ-9 experienced one Class A mishap when it landed short. Additionally, there was one Class E event in the MQ-9 community involving a near mid-air collision with a 747 at a deployed location.

MQ-1 and MQ-9 flight training operations could be conducted in restricted areas, ATCAAs, and MOAs (see Section 3.12 and 4.12). Operators further mitigate the mid-air collision hazard through strict airspace planning and procedures. The airspace is already designed to support live weapons training. A unique aspect of MQ-1 and MQ-9 flying operations is that the aircraft are unmanned. This means that a Class A mishap has no risk to aircrew. The pilot flies the aircraft via a data-link from a ground control station. In flight, if malfunctions occur and the data-link is lost, the aircraft is programmed to return to an alternative landing site within restricted airspace. Then it orbits over this pre-designated area while attempts are made to restore the data link. If all fails, the aircraft simply orbits until fuel exhaustion. If the engine power is lost, but the data link remains, the ground controller can pilot the aircraft to the alternative landing site via control of the aircraft's servos. The orbit location is such that there is little or no risk to persons on the ground.

There has never been a mid-air collision of a UAS aircraft with a manned aircraft, but the hazard is likely to increase as the number of UAS flights increases. During 2007 there were a total of 13 Class E Hazardous Air Traffic Reports (HATR) filed by both the UAS and manned aircraft communities involving a UAS aircraft (Kowitz 2008). The root cause for the UAS midair collision hazard is a lack of see-and-avoid capability. Analysis of the UAS midair collision hazard reveals

there are two primary mitigation strategies. The first is to segregate the UAS aircraft from other aircraft, and the second is to design out the lack of see-and-avoid with technology. Sense-and-avoid currently exist only at the National laboratories and will not be fielded for years (FAA 2005, Kowitz 2008).

BASH constitutes another safety concern because of the potential for damage to aircraft or local populations if an aircraft crash should occur in a populated area. Aircraft occasionally encounter birds at altitudes of 30,000 feet AGL or higher; however, most birds fly closer to the ground. Over 97 percent of reported bird strikes occur between ground to 4,000 feet AGL (Air Force Safety Center 2008b). Approximately 30 percent of bird strikes happen in the airport environment, and almost 78 percent occur during climbing and low-altitude flight (Air Force Safety Center 2008b). The potential for bird-aircraft strikes is greatest in bird migration corridors or where birds congregate for foraging or resting (e.g., open water bodies, rivers, and wetlands). Migratory waterfowl (e.g., ducks, geese, and swans) are the most hazardous birds to low-flying aircraft because of their size and their propensity for migrating in large flocks at a variety of elevations and times of day, although raptors and vultures also pose a strike hazard. Air Force Pamphlet 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Techniques* provides guidance for implementing an effective bird/wildlife aircraft strike hazard reduction program.

The two systems that are currently being used for estimating wildlife strike hazard are the U.S. Air Force's Bird Avoidance Model (BAM), and the Avian Research Laboratory's Avian Hazard Advisory System (AHAS). These tools provide information regarding bird strike risk, and allow pilots to make informed decisions about their routes with regards to wildlife strike risk (FAA 2008).

The MQ-1 and MQ-9 UAS ground activities would consist of ground system testing, maintenance, preparation, and flight tracking activities. Both scheduled and unscheduled maintenance activities would occur. Scheduled maintenance activities would include preflight and post-flight activities. Unscheduled maintenance would be performed as needed. Typical maintenance activities would include composite repair, system/subsystem repair, engine removal and replacement, servos and control surface checks and lube, other servicing, and propeller inspection, repair and replacement. Servicing would include adding petroleum, oil, hydraulic fluids, fuels, coolants, and refrigerants to the systems; using solvents, sealants, epoxies, solder, and adhesives for repair activities; and charging and replacing batteries. UAS fueling/defueling operations will take place on the ramp only. Previously fueled aircraft will be parked inside maintenance hangars, but fuel cell maintenance would take place in already established facilities dedicated for that purpose. Preflight checks would be conducted prior to each takeoff and would include engine stabilization, pre-launch inspection, and taxiing the UAS to the active runway. Maintenance and flight preparation activities would occur in existing hangars, facilities, or on the ramp. Flights would be controlled from the GCS (U.S. Air Force 2006a).

Ordnance is handled and stored in accordance with Air Force explosive safety directives (Air Force Manual 91-201, Explosives Safety Standards), and all munitions maintenance is carried out by qualified personnel using Air Force approved technical data. Munitions are stored and handled on the flightline in specified areas subject to strict management. Each location where live ordnance is stored or handled has a clear zone. Units at and above squadron level with an explosives, missile, or nuclear mission must have a weapons safety program. The host coordinates weapons safety for the entire base. Tenant units implement mission unique mishap prevention programs where the host does not have a mission in that area. All personnel who

operate, handle, transport, maintain, load, or dispose of missiles, explosives, or nuclear weapons must receive initial weapons safety training before performing any of those tasks.

Unexploded ordnance (UXO) is military munitions/explosive ordnance that has been primed, fused, armed, or otherwise prepared for action, and that has been projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material, and remains unexploded either by malfunction or design. UXO present an immediate risk of physical harm from fire or explosion resulting from the incidental or unintentional detonation.

3.10.1 Holloman AFB

Holloman AFB is located within a minor migration corridor in the Central Flyway (Air Force 2006). The most common species of migratory birds are northern mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), blue-winged teal (*Anas discors*), northern shoveler (*Spatula clypeata*), and Wilson's phalarope (*Phalaropus tricolor*). In the proximity of the migratory flyway and the LHWC is a complex of small lakes, constructed wetlands, and playas southwest of Runway 34, that contribute to potential bird strikes. The complex, which primarily serves as storage for treated effluent from the base's wastewater treatment plant, provides some of the only permanent water in the vicinity of the base and attracts primarily waterfowl and shorebirds. The local waters support low populations of breeding species, but support substantial migratory populations of waterfowl and shorebirds. At Holloman AFB, a total of 16 bird aircraft strikes were documented in 2005 and three in 2006 (January through March) (U.S. Air Force 2006b).

3.10.2 Edwards AFB

Common bird species found within the R-2508 complex include red-tailed hawk, killdeer (*Charadrius vociferus*), white-crowned sparrow (*Zonotrichia leucophrys*), turkey vultures, ravens, chickadees, warblers, nutcrackers, sapsuckers, larks, orioles, vireos, magpies, kites, scrub jays (*Aphelocoma californica*), wrentits (*Chamaea fasciata*), wrens, woodpeckers, flickers, owls, bushtits (*Psaltriparus minimus*), and western meadowlarks (*Sturnella neglecta*). Seasonal migratory birds use both permanent and temporary bodies of water for foraging on shrimp and other food items at Edwards AFB. These birds include ducks and geese such as the ruddy duck (*Oxyura jamaicensis*), northern mallard, northern pintail, Canada goose (*Branta canadensis*), and snow goose (*Chen caerulescens*).

From 1985 to 1998, 168 incidents of bird strikes (12 per year) were reported for flight operations at Edwards AFB. Approximately 28 percent of those bird strikes occurred during low-altitude flight. A comprehensive BASH program has been implemented at Edwards AFB to minimize habitat that attract bird species around the airfield (U.S. Air Force 2006a).

3.11 Noise Affected Environment

Noise is generally described as unwanted sound, which can be based either on objective effects (i.e., hearing loss, damage to structures, etc.) or subjective judgments (e.g., community annoyance). Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as sound level. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB.

When measuring environmental noise, the characteristics of human hearing are taken into account by using the "A-weighted" (dBA) decibel scale, which de-emphasizes the very high and very low frequencies to approximate the human ear's low sensitivity to these frequencies. This weighting provides a good approximation of the response of the average human ear and correlates well with the average person's judgment of the relative loudness of a noise event.

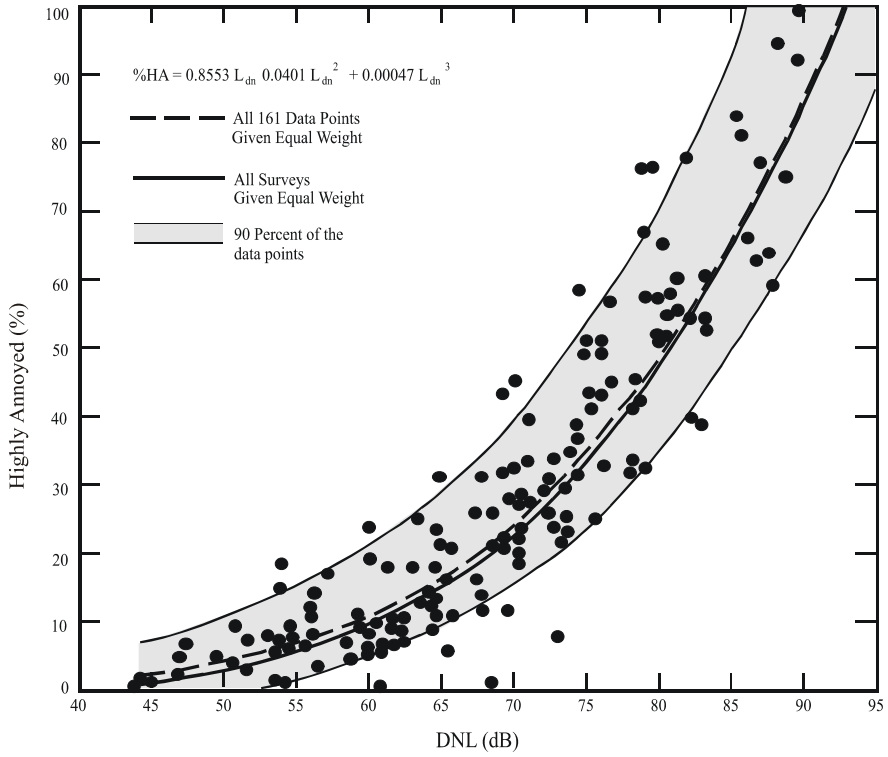
Noise levels occurring at night generally produce a greater annoyance than do the same levels occurring during the day. It is generally agreed that citizens perceive intrusive noise at night as being 10 dB louder than the same level of intrusive noise during the day, at least in terms of its potential for causing community annoyance.

The Noise Control Act of 1972 (PL 92-574) and several other Federal laws require the Federal government to set and enforce uniform noise standards for aircraft and airports, interstate motor carriers and railroads, workplace activities, medium and heavy duty trucks, motorcycles and mopeds, portable air compressors, Federal highway projects, and Federal housing projects. Military aircraft are exempt from the Federal Noise Control Act; however, Edwards AFB is located in California and California has its own noise regulations.

Noise levels are computed over a 24-hour period and adjusted for nighttime annoyances to produce the day-night average sound level (DNL). DNL is the community noise metric recommended by the USEPA and has been adopted by most Federal agencies (USEPA 1974). In California, average noise levels are described in terms of Community Noise Equivalent Level (CNEL).

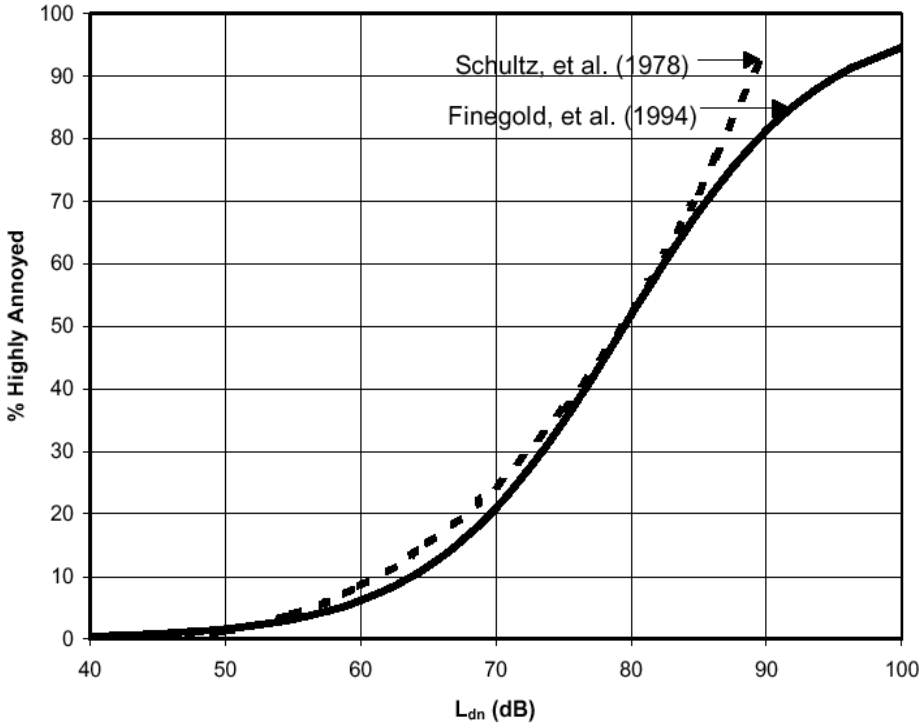
In general, scientific studies and social surveys have found a high correlation between the percentages of groups of people highly annoyed and the level of average noise exposure measured in DNL (USEPA 1978 and Schultz et al. 1978). The correlation from Schultz's original 1978 study is shown in Figure 3-12. It represents the results of a large number of social surveys relating community responses to various types of noises, measured in day-night average sound level.

Figure 3-12. Community Surveys of Noise Annoyance



A more recent study has reaffirmed this relationship (Fidell et al. 1991). Figure 3-13 (Federal Interagency Committee On Noise 1992) shows an updated form of the curve fit (Finegold et al. 1994) in comparison with the original. The updated fit, which does not differ substantially from the original, is the current preferred form. In general, correlation coefficients of 0.85 to 0.95 are found between the percentages of groups of people highly annoyed and the level of average noise exposure. The correlation coefficients for the annoyance of individuals are relatively low, however, on the order of 0.5 or less. This is not surprising, considering the varying personal factors that influence the manner in which individuals react to noise. However, for the evaluation of community noise impacts, the scientific community has endorsed the use of DNL (American National Standards Institute 1980; American National Standards Institute 1988; U.S. Environmental Protection Agency 1974; Federal Interagency Committee On Urban Noise 1980 and Federal Interagency Committee On Noise 1992).

Figure 3-13. Response of Communities to Noise; Comparison of Original (Schultz 1978) and Current (Finegold et al. 1994) Curve Fits



Source: Finegold et al. 1994

The use of DNL (CNEL in California) has been criticized as not accurately representing community annoyance and land-use compatibility with aircraft noise. Much of that criticism stems from a lack of understanding of the basis for the measurement or calculation of DNL. One frequent criticism is based on the inherent feeling that people react more to single noise events and not as much to “meaningless” time-average sound levels.

In fact, a time-average noise metric, such as DNL and CNEL, takes into account both the noise levels of all individual events that occur during a 24-hour period and the number of times those events occur. The logarithmic nature of the decibel unit causes the noise levels of the loudest events to control the 24-hour average.

As a simple example of this characteristic, consider a case in which only one aircraft overflight occurs during the daytime over a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The DNL for this 24-hour period is 65.9 dB. Assume, as a second example, that 10 such 30-second overflights occur during daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The DNL for this 24-hour period is 75.5 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of those events.

3.11.1 Holloman AFB

Holloman AFB currently supports approximately 231 aircraft operations per day. Noise contours calculated for Holloman AFB range from DNL 65 to DNL 80. Primary operations that contribute to noise levels consist of the QF-4, T-38, Tornado, Army Air helicopters, motorized gliders, frequent TDY support aircraft for Army Air or DoD missions, and F-22 aircraft currently assigned to the installation. The project area for the proposed MQ-1/MQ-9 FTU-2 beddown is located inside the Holloman AFB 70 DNL and 75 DNL noise contour (Figure 3-14). The incorporated boundary of the City of Alamogordo is about 5 miles east of the base. Although the city controls land use through zoning, neither the city nor the county has policies that consider noise exposure from aircraft operations at Holloman AFB (GSRC 2008).

Approximately 60 percent of the land exposed to noise levels of 65 DNL or greater is used for military activities. Grazing is the dominant use of most of the off-base land with some commercial/industrial development along U.S. 70. These uses are compatible with the current noise exposure levels. Some facilities at White Sands National Monument are exposed to noise levels that are not optimal for the monument's visitors; however, flight patterns used by aircraft avoid direct overflight of facilities to the greatest extent possible. Under baseline conditions, approximately 14 percent of White Sands National Monument is exposed to sound levels of 65 dBA or greater. Private parcels along the eastern and southern boundaries of the installation are undeveloped (Holloman AFB 2008).

3.11.2 Edward AFB

The average number of sorties per day at Edwards AFB is 144 (Edwards AFB 2006). According to noise contours for Edwards AFB (updated in 2004) the noise is greatest around the airfield, NASA Dryden Flight Research Center (DFRC), and industrial areas. The noise levels near the residential areas and at the perimeter of the base remain below the 65 dB CNEL. Major noise sources at Edwards AFB are aircraft operations that include rotary wing air traffic, engine testing, sonic booms, and vehicle traffic on streets. The major sources of motor vehicle-related noise at Edwards AFB are Lancaster Boulevard, Rosamond Boulevard, and primary and secondary streets on the base (Edwards AFB 2005).

The Main Base residential area is outside the 60 dB contour, although the Main Base has a range of exposure from 65 to 85 dB (Figure 3-15). The South Base has a noise contour range of 70 to 85 dB. On-base land under the 80 dB noise contours is primarily open space and test program support area. The South Base and a portion of the Main Base are currently within the 80 dB noise contour; therefore, small areas of administrative, commercial, and industrial land are subject to these noise levels. The area around AFRL is subject to very high levels of noise during rocket engine tests. Test firings occur infrequently during daytime hours for 1 to 3 minutes at a time. Smaller engines are also tested at this location, and noise levels are less than half those produced by the large Titan engines. Approximately 1,750 people reside within the 80-dB contours of Titan test firings (Edwards AFB 2005).

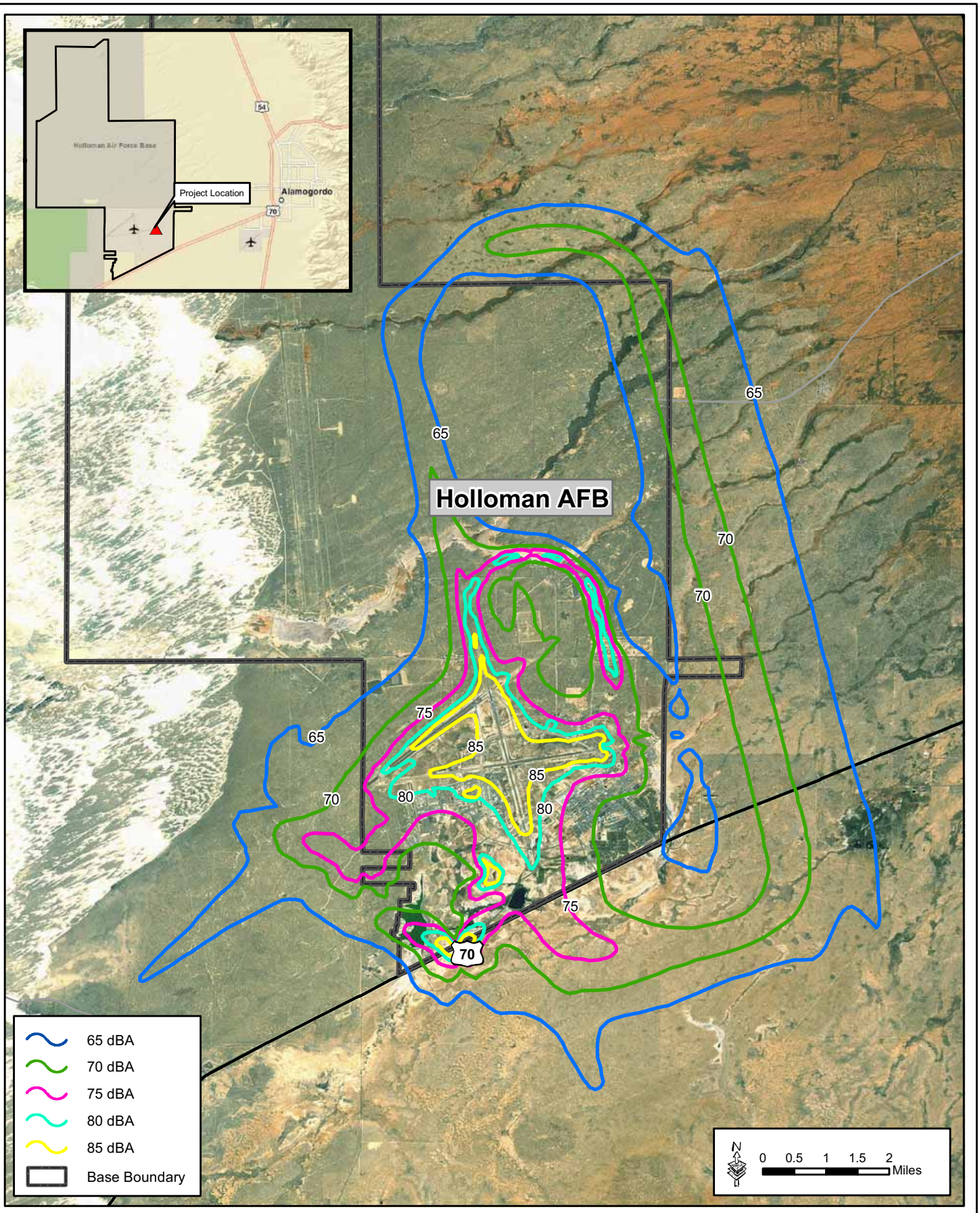


Figure: 3-14: Holloman Air Force Base Base Line Noise Contours

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March 2009

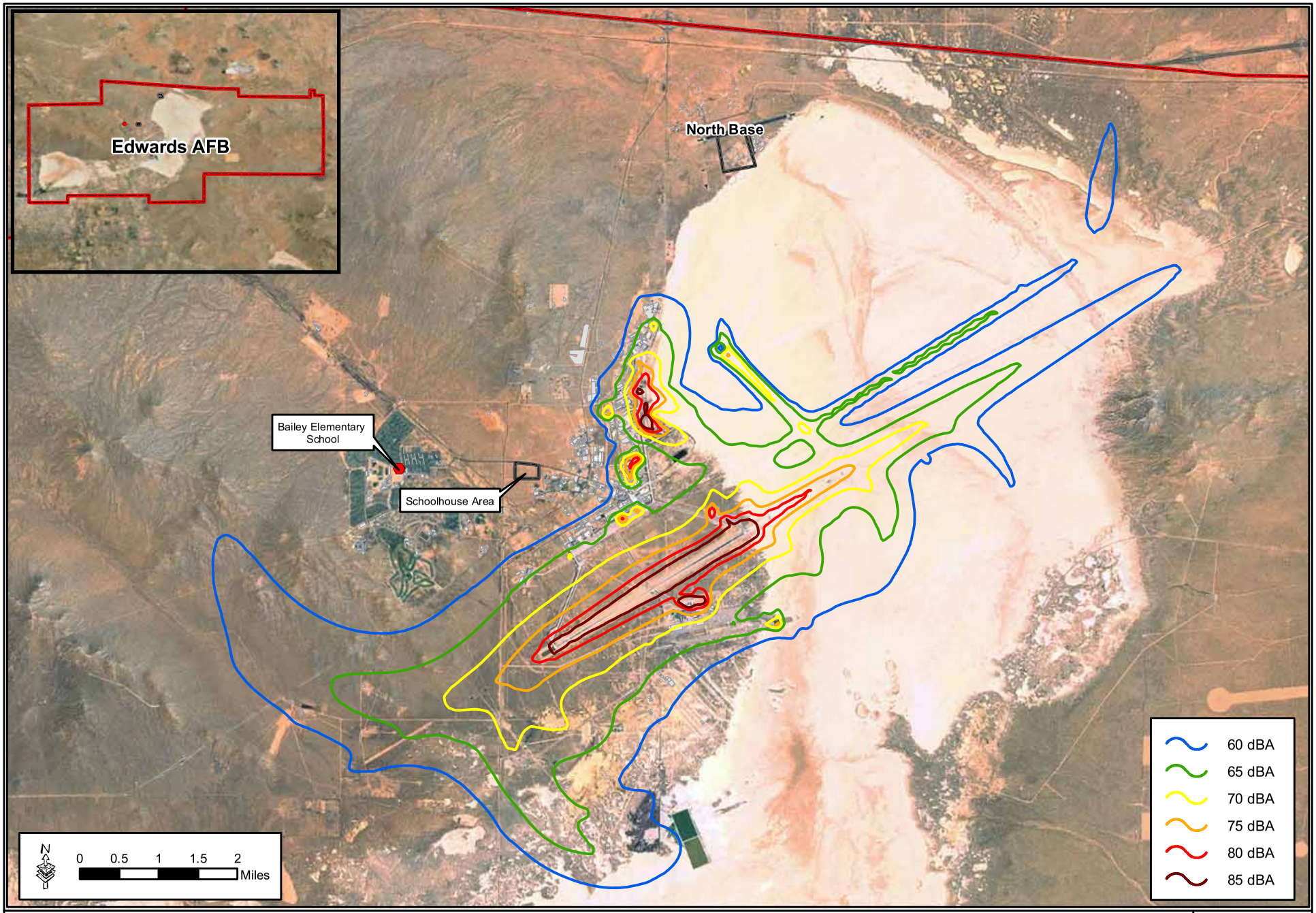

Figure 3-15: Edwards Air Force Base Base Line Noise Contours

GSRC

February 2009

3.12 Airspace

3.12.1 Holloman AFB

Albuquerque Center is the FAA's Air Route Traffic Control Center (ARTCC) responsible for the airspace in the vicinity of Holloman AFB, but the responsibility for the management of air traffic at Holloman AFB has been delegated to Holloman Approach Control (US Air Force 2006). The airspace at Holloman AFB is managed in accordance with AFI13-201, *Air Force Airspace Management*, which implements Air Force Planning Document 13-2, *Air Traffic Control, Airspace, Airfield, and Range Management*, and Department of Defense (DoD) Directive 5030.19, *DoD Responsibilities on Federal Aviation and National Airspace System Matters*.

Class D Controlled Airspace has been established around Holloman AFB to manage its flight operations. This airspace extends from the surface up to and including 6,600 feet MSL, within a 4.8 statute mile radius of Holloman AFB. However, it excludes airspace within a 2 statute mile radius of the Alamogordo-White Sands Regional Airport, which is located approximately 5 nautical miles east of Holloman AFB.

The restricted airspace over WSMR and McGregor Range has historically been used by the DoD for testing and training. Coordinated scheduling has allowed needs of DoD users to be met although with perturbations. The WSMR and McGregor Restricted Areas, in conjunction with the Holloman AFB managed MOA and ATCAAs, has adequately supported Holloman-based aircrew training. Much of that same airspace, as described in Table 3-15, would be utilized to support MQ-1/MQ-9 training. Six Holloman AFB-managed Military Training Routes (MTR) and four MTRs managed by other DoD entities are available and utilized to support training missions at Holloman AFB, although UAS cannot use MTRs (U.S. Air Force 2006).

3.12.2 Edwards AFB

The airspace used by Edwards AFB operations was described in the April 2008 Final EA entitled "*Routine and Recurring Small Transient and New Test Missions*" prepared by the 95th Air Base Wing, Environmental Management Directorate, Edwards AFB, California (95th Air Base Wing 2008). That information is incorporated herein by reference. Briefly, seven Restricted Airspaces and 11 MOAs comprise the R-2508 Complex Special Use Airspace (SUA), which contains 19,600 square miles of airspace (see Figure 2-6). The airspace is scheduled, monitored, regulated, and controlled to provide safe aircraft test areas in accordance with the same AFI and DoD procedures described above for Holloman AFB, as well as the Air Force Flight Test Center (AFFTC) AFFTCI-11-1, Aircrew Operations and the *R-2508 Complex User's Handbook* which can be found online at http://r2508.edwards.af.mil/Downloads/index.html.

The average number of flights ranges from approximately 185 per day over the entire R-2508 Special Use Airspace (SUA) to approximately 40 per day over Edwards AFB (i.e., R-2515). One established commercial air traffic route transects the R-2508 SUA; however, that route is normally closed during daylight hours on Monday through Friday. Flight activity within the R-2508 SUA is controlled by the FAA, which has maintains facilities/operations on Edwards AFB. As indicated previously in Section 2.3.4, however, the total number of sorties at Edwards AFB in 2008 was well below these average numbers at 9,600 (or approximately 26 operations per day) (Kiernan 2009).

Table 3-15. Airspace Identification and Description

	Altitudes		Hours of Use	
	Minimum	Maximum	From	To
Airspace				
Beak A MOA	12,500 feet MSL	UTBNI FL180	0600	Sunset
Beak B MOA	12,500 feet MSL	UTBNI FL180	0600	Sunset
Beak C MOA	12,500 feet MSL	UTBNI FL180	0600	Sunset
Beak A/B/C ATCAAs	FL180	UTBNI FL230	As scheduled and coordinated	
Ancho A/B/C ATCAAs	FL180	UTBNI FL230	As scheduled and coordinated	
Cowboy A/B/C ATCAAs	FL230	FL600	As scheduled and coordinated	
Talon High East MOA	12,500 feet MSL	FL180	Sunrise	Sunset
Talon High West MOA	12,500 feet MSL	FL180	Sunrise	Sunset
Talow Low MOA	300 FEET AGL	UTBNI 12,500 feet MSL	Sunrise	Sunset
Talon High East and West ATCAAs	FL180	FL600	As scheduled and coordinated	
Valmont ATCAA	FL180	FL600	As scheduled and coordinated	
Restricted Area				
R-5103B (McGregor)	Surface	Unlimited	0700†	2000†
R-5103C (McGregor)	Surface	Unlimited	0700†	2000†
R-5107A (Ft Bliss)	Surface	Unlimited	Continuous	
R-5107B (WSMR)	Surface	Unlimited	Continuous	
R-5107C (WSMR)	9,000 feet MSL	Unlimited	Continuous Monday - Friday 12 hours in advance††	
R-5107D (WSMR)	Surface	FL220	Continuous	
R-5107E (WSMR)	Surface	Unlimited	By NoTAM 12 hours in advance	
R-5107F (WSMR)	FL240	FL450	Continuous M-F; 12 hours in advance pm weekends	
R-5107G (WSMR)	FL240	FL450	Continuous M-F; 12 hours in advance pm weekends	
R-5107H (WSMR)	Surface	UTBNI 9,000 feet MSL	By NoTAM 12 hours in advance	
R-5107J (WSMR)	Surface	UTBNI 9,000 feet MSL	Continuous Mon-Fri 12 hours in advance ††	
R-5109A	24,000 feet MSL	Unlimited	Intermittent by NoTAM	
R-5109B	24,000 feet MSL	Unlimited	Intermittent by NoTAM	
R-5111A (WSMR)	13,000 feel MSL	Unlimited	By NoTAM 12 hours in advance	
R-5111B (WSMR)	Surface	UTBNI 13,000 feet MSL	By NoTAM 12 hours in advance	
R-5111C (WSMR)	13,000 feel MSL	Unlimited	By NoTAM 12 hours in advance	
R-5111D (WSMR)	Surface	13,000 feet MSL	By NoTAM 12 hours in advance	

Notes: † – other times by NOTAM, †† – other times by NOTAM, 12 hours in advance
UTBNI = Up to, but not including; AGL = above ground level; FL = Flight level. FL 180 is approximately 18,000
Feet MSL; MSL= mean sea level; NOTAM = Notice to Airmen
Source: U.S. Air Force 2006

SECTION 4.0
ENVIRONMENTAL CONSEQUENCES

4.0 Environmental Consequences

4.1 Land Use Resources

4.1.1 No Action Alternative

The implementation of the No Action Alternative would not impact transportation, visual resources or land uses at Holloman AFB or at Edwards AFB.

4.1.2 Holloman AFB Alternative

4.1.2.1 Transportation

On-base automobile traffic has declined over the past several years due to the loss of several aircraft training programs. In 2000, the Holloman AFB road infrastructure was able to handle traffic for 7,097 staff, contractors and students. The current student, staff and contractor population at Holloman AFB is 2,679. Therefore, the decline in personnel is 4,418 and the road infrastructure is operating at less than 50 percent capacity (Holloman AFB 2009). The new training force, once the beddown is complete, would consist of 200 students and 600 staff. It is anticipated that the students would live in dormitory housing on Holloman AFB and would be able to walk to classes and other training activities. The students are less likely to be traveling during shift change or rush hour; however, it is assumed that the 600 staff would live off-base and would utilize automobiles to commute during shift change or rush hour. The staff automobiles would contribute to on-base road congestion; however, the addition of automobiles would not exceed the design capacity of the Holloman AFB road infrastructure. Automobile transportation impacts would be minor due to the original design capacity and current population of staff at Holloman AFB. Traffic along U.S. 70 and 54 is below capacity and the addition of the 600 new commuters in the area would not have a significant impact on the roads and intersections in the area.

4.1.2.2 Visual Resources

Construction and renovation projects associated with the Proposed Action would be designed to be visually consistent with existing structures at Holloman AFB. The visual character of the site is typical of military and civilian airfields and the visual sensitivity of the area is low. Adverse visual impacts are anticipated during construction, created both by the construction itself and by the associated increase in traffic, dust, and equipment. These impacts, however, would be minor and short-term in nature.

The visual impact of aircraft launches and traffic would co-exist with other aircraft operations. The general public in the area of the Holloman AFB is accustomed to seeing various military aircraft performing training maneuvers. Therefore, the visual presence of horizontal launches would not be new to the area and the introduction of the MQ-1/MQ-9 operations would not create a significant impact to visual resources in the area.

The typical operating altitudes of the aircraft would be 5,000 to 25,000 feet AGL for the MQ-1, and 15,000 to 35,000 feet AGL for the MQ-9. The visual signature of these aircraft would be similar to that of a Cessna 172. The small, sleek aircraft would be virtually invisible to the public (by design) and would not create a significant impact on visual resources during training operations.

4.1.2.3 Land Use

The construction of new facilities or renovations of existing facilities to accommodate the MQ-1/MQ-9 beddown would occur on previously disturbed areas adjacent to other Holloman AFB buildings. Although there would be new construction associated with the proposed taxiway, no

changes in land use are planned and the MILCON projects would be consistent with the base's master plan. Land use would remain for military purposes.

4.1.3 Edwards AFB Alternative

4.1.3.1 Transportation

The Mojave Barstow Highway (California Highway 58) is a 4-lane highway located just north of the Edwards AFB and U.S. 395 is a 4-lane highway located on the east side of Edwards AFB. Both of the highways have off ramps leading to the base and the intersections and the flow of the major highways would not be significantly impacted by the addition of 600 new commuters.

On-base automobile traffic has declined over the years due to the loss of other missions at Edwards AFB. In 2003, the on-base population of military staff and civilians was approximately 16,890. Since then, the population has declined by 2,875 persons to 14,015 in 2007 (Edwards AFB 2009). The existing road infrastructure would be able to handle the addition of 600 automobiles; the impacts would be minor since to the original design capacity of the road infrastructure is much greater than the current traffic demands.

4.1.3.2 Visual Resources

The impacts to visual resources would be similar to those described for the Holloman AFB Alternative.

4.1.3.3 Land Use

The impacts to land use resources would be similar to those described for the Holloman AFB Alternative.

4.2 Infrastructure

4.2.1 No Action Alternative

Under the No Action Alternative, the MQ-1/MQ-9 FTU-2 beddown would not occur; therefore, there would be no impacts to any utilities infrastructure at Holloman or Edwards AFBs.

4.2.2 Holloman AFB Alternative

4.2.2.1 Electrical Distribution

The existing buildings that are proposed to be used for the MQ-1/MQ-9 FTU-2 beddown are currently served by the existing electrical infrastructure. Electrical usage and demand are expected to remain at levels similar to the past use these buildings experienced, and thus, no improvements to the existing electrical distribution system would be required, with the exception of Building 302. Electrical repairs to this building will be required prior to the beddown. No effects to public electrical sources would be expected. Total power usage may increase due over historical levels as MQ-1/MQ-9 operations will potentially run 24 hours; however the buildings will be renovated with high efficiency lighting and HVAC systems. The overall electrical usage may increase from 24-hour operations, but it will be offset by other efficiency improvements being completed base wide.

4.2.2.2 HVAC System

The existing buildings that are proposed to be used for the MQ-1/MQ-9 FTU-2 beddown are currently served by the existing HVAC systems. Building 302 which is expected to be used for FTU squadron operations will need repairs to the HVAC system prior to the beddown. The usage and demand of the HVAC system in the remaining facilities are expected to remain at levels similar to the past use that these buildings experienced, and thus, no additional improvements would be required.

4.2.2.3 Potable Water/Fire Protection System

Anticipated water uses for the Proposed Action include potable water for consumption and personnel use, facility wash down and maintenance needs. Water usage would increase by 50 gallons per person per day as a result of the Proposed Action (Gleick 1996). Therefore, potable water demand on-base would increase approximately in the range of 37,500 to 40,000 gallons per day based on 750 to 800 personnel, respectively. This amount represents less than 2 percent increase over the historic average demands and a 3 percent increase over current FY 2008-2009 demands. This increase would still be below historic water demands due to the recent decreases in staff at Holloman AFB. According to the El Paso Water Utilities Hydrology Report for Holloman AFB (EPWU 2002), the recharge rate for the Tularosa basin is 6,043 acre-feet per year (1.96 billion gallons per year). The addition of new staff and students would have negligible impacts to the water supply at Holloman AFB.

The proposed usage and occupancy for the existing buildings is anticipated to generate the water demand the buildings historically experienced with the exception of fire protection for three buildings. Pumping and storage may be required to provide adequate fire protection pressure and supply. Based on current practice, it is expected that the bulk of fire protection needs for the MQ-1/MQ-9 aircraft would be provided by a high expansion foam system.

4.2.2.4 Wastewater

Assuming the usage and occupancy remains similar to the past use these buildings experienced, no additional sewer demands would occur, and therefore the existing sewer collection system would not need to be improved. Anticipated wastewater flows generated from the facilities appear to be well within the treatment limits of the plants permitted capacity. It is recommended that building cleanouts and sewer mains in the vicinity of the proposed MQ-1/MQ-9 FTU-2 beddown site are inspected at the time of final design. Any sewer lines that may be deteriorated, or otherwise may pose problems in the life span of the beddown, should be considered for rehabilitation during initial improvements, to avoid interruptions of operations and minimize cost and inconvenience.

4.2.2.5 Gas

As long as the usages of the buildings remain similar to the past uses these buildings experienced, no additional gas demands would occur; therefore, the proposed MQ-1/MQ-9 FTU-2 beddown site would not require any improvements to the existing gas distribution system. Natural gas supply does not appear to be a limiting factor to support the beddown complex.

4.2.2.6 Storm Drainage System

It is recommended that detailed drainage calculations occur at the time of final engineering design of the MQ-1/MQ-9 FTU-2 beddown to ensure that these operations as well as any new or modified facilities adhere to the USEPA General NPDES requirements.

4.2.2.7 Liquid Fuels

Self Contained Aboveground Tanks (SCAT) positioned near Hangars 301 and 500 would be used as AVGAS fuel storage sites. Bays one/two of Hangar 868 could also be used as the primary fuel facility for the F-22 and UAV. JP-8 fuel storage would be accommodated in an existing LRS storage facility and transported to the MQ-1/MQ-9 via trucks. Additional pipeline would not be required. The proposed aircraft parking area is the existing parking apron. The area is well drained with retention ponds to hold run-off and any aviation fire fighting foam (AFFF) that may be released in compliance with Holloman AFB NPDES permit requirements and internal BMPs.

4.2.2.8 Communications System

The extant buildings proposed for the MQ-1/MQ-9 FTU-2 beddown are currently served by the existing communications system. Since base personnel would increase with the proposed beddown, telephone, network and special circuit requirements must be identified through the submission of a PWRR request. The FTU will require specialized communications infrastructure for the Ground Control Station (GCS) and the Ground Data Terminal (GDT). The GCS will be located near Building 302 and the GDT will be located on the airfield. Both of these will require installation of fiber/copper in the ground. A Defense Information Systems Agency circuit will need to be installed in building 221 which is the base telecommunications office. Buildings 302 and 318 will require new wiring for mission specific communications. Holloman AFB currently has the capacity to meet these infrastructure requirements.

4.2.3 Edwards AFB Alternative

4.2.3.1 Electrical Distribution

The North Base and the school house areas are currently located near existing electrical infrastructure. Assuming the usage and demand remain similar to the past use these buildings experienced, no additional electrical demands would occur, and, therefore, the existing electrical distribution system would not need to be improved at the North Base and school house area.

4.2.3.2 HVAC System

The existing buildings that are proposed to be used for the MQ-1/MQ-9 FTU-2 beddown are fairly new and are currently served by the existing HVAC systems. Building 4230 recently had a new roof installed and will consequently need the HVAC system replaced in that area. Building 4231 only has heat on one side of the building; therefore, the other side of the building would need a heating system to be added if it is to be used for office space. The usage and demand of the HVAC system in the remaining facilities are expected to remain at levels similar to the past use that these buildings experienced, and thus, no improvements would be required with the exception of those mentioned.

4.2.3.3 Potable Water/Fire Protection System

Anticipated water uses for the Proposed Action include potable water for consumption and personnel use, facility washdown, and maintenance needs. Existing water demands by Edwards AFB personnel were estimated to be approximately 50 gallons per day per student or staff (Gleick 1996). An increase of 750 to 800 Edwards AFB personnel and students would increase the potable water demand on-base by approximately 13.7 to 14.6 million gallons per year. The addition of new staff and students would have negligible impacts to the water supply at Edwards AFB.

The proposed usage and occupancy for the buildings is anticipated to generate the water demand the buildings historically experienced, with the exception of fire protection. Edwards AFB has indicated that the North Base area has the best water pressure and is the most likely to serve the fire protection demand. Based on current practice, it is expected that the bulk of fire protection needs for the MQ-1/MQ-9 aircraft would be provided by a high expansion foam system.

The school house area is proposed in an area relatively new to development; however, there are existing water lines near the proposed area that could be utilized. It is recommended that the water demands for the multiple proposed buildings be modeled to determine if any improvements to the existing water system are necessary.

4.2.3.4 Wastewater

Anticipated wastewater flows that would be generated from the facility on the North Base appear to be well within the treatment limits of the plants permitted capacity. According to Edwards AFB, the wastewater treatment plant for the base has an abundant amount of available capacity. Assuming the usage and occupancy remains similar to that which the existing buildings and WWII era hangars on the North Base experienced, no additional sewer demands would occur, and therefore, the existing sewer collection system would not need to be improved.

The school house area would need to tie into the existing sewer system to the east, near the existing dormitories. Edwards AFB personnel have stated that the sewer system lines in this area are relatively deep, approximately 12 feet. Although this depth may generate higher construction costs, it allows ease of connection to the existing gravity sewer system. Edwards AFB personnel have also stated that the capacity should not be a concern since an undisclosed number of dormitories are anticipated to be removed from the sewer system and demolished. If no dormitories are taken off the sewer system, it is recommended the existing lines be evaluated to confirm the additional flow from the school house area does not adversely affect the sewer system.

4.2.3.5 Gas

Assuming the gas usages of the buildings used for the MQ-1/MQ-9 FTU-2 beddown on the North Base remain similar, the proposed beddown would not require any improvements to the existing gas system.

Based on interviews with Edwards AFB personnel, site visits and Geographical Inforamtion System(GIS) data collected from Edwards AFB, the school house area is located near a natural gas main and is capable of supporting minimal additional building demand. At the time of final design, it is recommended that the proposed demands of the school house area be modeled with the existing gas system to determine if additional infrastructure is needed.

4.2.3.6 Storm Drainage System

Since the North Base option is utilizing existing structures it is recommended that the existing grades and storm runoff diversion system be utilized so as not to impact the flight line. All drainage calculations and design which shall occur at time of final engineering and design of the MQ-1/MQ-9 FTU-2 beddown site and adhere to the USEPA and California Water Resources Board (CWRB) NPDES requirements.

4.2.3.7 Liquid Fuels

The North Base is not located near any fuel hydrants. The North Base Option would require tanker trucks to fill up at Main Base and transport the fuel to North Base. Another option would be to construct an expensive fuel distribution system at the North Base, which would deliver and store the fuel for the aircraft.

4.2.3.8 Communications System

The North Base and school house areas are located near existing communications infrastructure. Since base personnel would increase with the beddown, telephone, network and special circuit requirements must be identified through the submission of a PWRR request to 95 CG/SCX. The FTU will require specialized communications infrastructure for the GCS and the GDT. The GCS would likely be located near buildings 4230/4231, the proposed squad ops buildings, and the GDT will be located on the airfield. Both of these will require installation of fiber/copper in the ground. A Defense Information Systems Agency circuit will need to be

installed in the base telecommunications office. The squad ops buildings will also require new wiring for mission specific communications. Edwards AFB would likely have the capacity to meet these infrastructure requirements but may require MILCON to meet the requirements.

4.3 Cultural Resources

4.3.1 No Action Alternative

Under the No Action Alternative the MQ-1/MQ-9 FTU-2 beddown would not occur. The No Action Alternative would have no impact on cultural resources at either Holloman AFB or Edwards AFB. However, it would not allow the ACC to proactively accommodate current demands for CAP growth while enabling UAS normalization for long-term sustainment.

4.3.2 Holloman AFB Alternative

Implementation of the Proposed Action at Holloman AFB would primarily involve use of existing buildings and infrastructure and, thus, potential impacts to cultural resources would be limited. The Proposed Action would require the upgrade, repair and conversion of buildings and infrastructure such as roads and ramps to bring them to standards for long-term viability. Where repair of the existing infrastructure such as roads and ramps would include the replacement of that which currently exists on previously disturbed property, no impact to cultural resources would be expected. Building #301 is considered eligible for NRHP. However, the New Mexico SHPO has concurred to the proposed use of the building, construction of exterior additions and installation of fire protection to the building. Any further modifications would occur under consultation with New Mexico SHPO.

The proposed beddown includes the construction of a new taxiway. The proposed taxiway will run north-south parallel to Runway 16/34. The area including the proposed new taxiway has previously been surveyed by Human Systems Research (HSR) in 1994 (O'Leary 1994) and Geo-Marine in 1996 (Sale et al. 1996). The HSR and Geo-Marine surveys reported no cultural resources in that area. As a result, no impacts to cultural resources are expected.

4.3.3 Edwards AFB Alternative

The proposed beddown at Edwards AFB would involve the use of the existing Bailey Elementary School on the main base during initial stand up and then a school house area would be built within the cantonment area of the Main Base area. Both the Bailey Elementary School and the site selected for the new school house area have been previously surveyed and no cultural resources were reported. The use of the Bailey Elementary School and construction of the new school house would not impact cultural resources.

Additionally, several sites on the North Base would be selected for the construction of new facilities to support the MQ-1/MQ-9 FTU-2 beddown. Three buildings on the North Base are proposed to be demolished by the Proposed Action. Building number 4401 and 4402 were built in 1943 and Building 4400 was built in 1969; none of the buildings are considered eligible for NRHP (Loechl et al. 2007). Building 4305 is located 100 feet to the southwest of building 4401 and is considered eligible for NRHP (Kilanowski et al. 1992). ACC would take necessary precautions to avoid disturbance of this structure, to the extent practicable.

While the specific locations for the proposed construction activities on Edwards AFB have not been identified, all general locations that are being considered have been surveyed and no NRHP-eligible sites were discovered. Given the negative results of these surveys and ACC's commitment to implement appropriate mitigation measures, no adverse impacts on historic properties would be expected.

4.4 Socioeconomics and Environmental Justice

4.4.1 No Action Alternative

Under the No Action Alternative, the MQ-1/MQ-9 FTU-2 beddown would not occur. The No Action Alternative would have no impact on socioeconomic resources or environmental justice at either Holloman AFB or Edwards AFB.

4.4.2 Holloman AFB Alternative

Revenue in the region would increase temporarily during any period(s) of building repairs, building renovation or conversion, and the construction of the parallel taxiway. There would be an additional demand for temporary quarters, base exchange, commissary and other community-related functions, which would increase revenue temporarily.

In the long-term, increased revenue would be associated with an increase in expenditures from the additional 200 transient and up to 600 permanent personnel associated with the MQ-1/MQ-9 FTU-2 beddown. Based on the average accompanying dependent factor of 1.8 (Air Force Center for Environmental Excellence 2001), direct permanent population changes as a result of the beddown would be an increase of approximately 1,680 people (450 military personnel and 150 contractors and 1,080 dependents). The number of personnel assigned to Holloman AFB as of January 2009 is 2,679 persons (Holloman AFB 2009). If the accompanying dependent factor of 1.8 is used, the current population would be approximately 4,822 persons. An increase of 1,680 people would represent a 35 percent increase of the 2009 estimated population at Holloman AFB, and 4.1 and 2.7 percent of the census year 2000 population at Holloman AFB and nearby communities and Otero County, respectively. With the recent decrease in military and civilian personnel at Holloman AFB, the increase in personnel would have an overall long-term positive impact on revenue in the region.

Housing would be available on Holloman AFB, in nearby communities, and in Otero County for 600 personnel (and their dependents) associated with the MQ-1/MQ-9 FTU-2 beddown. Although census year 2000 data indicate that there are only 34 vacant housing units at Holloman AFB, the remaining demand could be absorbed by the nearby communities and rural areas in Otero County. Housing unit vacancy in Otero County, on Holloman AFB and in nearby communities are 21, 8, and 16 percent, respectively. Consequently, an increase of 600 personnel (and their dependents) would not have a significant impact on housing.

The MQ-1/MQ-9 FTU-2 beddown would cause an increase in demand for public services such as police and fire services and the public school system. This increase would not exceed previous demands established prior to the lower manning rate at Holloman AFB. Potential adverse impacts would be temporary and short-term in nature until upgrades are made in the capacity of public services. However, no permanent adverse impacts on these services would be expected once adjustments have been made on these public services.

Minority, low income, and youth populations across the ROI, at Holloman AFB, and in the Alamogordo area are comparable to those of the State of New Mexico. The Option A site is not near any sensitive noise receptors (i.e., children or schools), and due to the short-term period of renovation and parallel taxiway construction, impacts to children are not expected. There would be no disproportionate impact upon minority or low-income populations or upon children.

4.4.3 Edwards AFB Alternative

Temporary revenue increases to socioeconomic resources at Edwards AFB would be similar to those described for Holloman AFB. Similarly, long-term increased revenue would be generated

associated with the addition of transient and permanent personnel associated with the MQ-1/MQ-9 FTU-2 beddown. However, beddown at Edwards AFB would require substantial construction and MILCON funding to construct ramp space and other facilities (e.g., a parking apron, engine shop, maintenance hangar) and would contribute a short-term increase in revenue for a limited period of time.

Long-term beneficial impacts of increased revenue at Edwards AFB would be similar as those described for Holloman AFB. An increase of approximately 1,680 people would represent less than 1 percent of the census year 2000 population of the 3-county ROI. The increase in personnel and their dependents would constitute a 6 percent increase in the population at Edwards AFB based on 2007 personnel population data (14,015 persons; Edwards AFB 2009) and the accompanying dependent factor (1.8). With the recent decrease in military and civilian personnel at Edwards AFB, the increase in personnel would have an overall long-term positive impact on revenue in the region.

Housing would be available on Edwards AFB and nearby communities for 600 personnel (and their families) associated with the MQ-1/MQ-9 FTU-2 beddown. Although census year 2000 data indicate that there are only 105 vacant housing units Edwards AFB, the remaining demand could be absorbed by the nearby communities and rural areas in the 3-county ROI. Housing unit vacancy in the 3-county ROI and on Edwards AFB, according to census year 2000 data, is 6 percent. Consequently, an increase of 600 personnel (and their dependents) would not have a significant impact on housing.

Temporary potentially adverse impacts on public services as described for Holloman AFB could occur at Edwards AFB. However, no long-term adverse impacts on public services would be expected.

There are no minority or low income populations on or near Edwards AFB, and the towns nearest to Edwards AFB are at least 12 miles away. The population of youth on Edwards AFB is comparable to the youth population across the ROI and in the state. The closest buildings to the school house area are on Methusa Avenue which are office buildings, a recreation facility, cafeterias, and temporary quarters for unaccompanied personnel. There would be no disproportionate impact upon minority or low-income populations or upon children.

4.5 Biological Resources

4.5.1 No Action Alternative

Under the No Action Alternative, there would be no beddown of MQ-1/MQ-9 FTU-2 at Holloman AFB. There would be no impacts to biological resources as a result of the No Action Alternative.

4.5.2 Holloman AFB Alternative

The Option A site is centered on the Main Ramp and leverages existing facilities to support the beddown. This area of Holloman AFB is previously developed and would have little impact on biological resources.

With the exception of the proposed taxiway, ground disturbing activities on Holloman AFB would be within or near the developed areas and would not impact any natural vegetation communities. There could be some disruption to wildlife that is associated with developed areas such as mice, rats, bats, and birds. These animals would likely remain in the buildings or move to adjacent uninhabited buildings and structures as project activities increase.

Construction of the proposed taxiway would remove approximately 16 acres of alkali sacaton grassland from biological production. This community type is common throughout the Tularosa Basin and the loss of 16 acres would not be considered a significant impact.

As discussed in Section 3.5.1.2.2, there are two areas of wetlands (LHWC and BWWSA) on Holloman AFB, which are located approximately 3 miles and 7 miles from the proposed beddown location respectively. Since the proposed beddown facilities would occur within developed areas and a considerable distance from these two sites, no wetland communities or freshwater aquatic communities would be impacted by the Proposed Action.

Of the 23 listed species (see Table 3-2), only four species are considered to have the potential to be affected by the Proposed Action at Holloman AFB: southwestern willow flycatcher, interior least tern, Mexican spotted owl and northern aplomado falcon. The remaining 19 species have no potential of effect from the Proposed Action and, thus, are not discussed further.

There could be marginal habitat for the southwestern willow flycatcher within the woodland area at LHWC and the interior least tern has been reported as a rare migrant at the LHWC. The Proposed Action would not cause disturbance to the LHWC, and therefore, would not impact the southwestern willow flycatcher or the interior least tern. The beddown renovation or construction would occur on previously disturbed ground and would not be expected to impact any endangered, threatened or sensitive biological species.

There is critical habitat for Todsen's pennyroyal approximately 34 miles northwest of Holloman AFB on WSMR within Rhodes Canyon (USFWS 2009). This critical habitat is within airspace R-5107B; however, since there would be no ground disturbing activities in this area, including ordnance delivery, there would be no impact to Todsen's pennyroyal as a result of this project.

The northeast corner of airspace R-5103B/C is located above the Sacramento Mountains and a small portion of the Lincoln National Forest. There is critical habitat for the Mexican spotted owl within the Lincoln National Forest. Delaney et al. (1999) evaluated nesting and non-nesting Mexican spotted owl responses to military helicopter training noise over the Lincoln National Forest. Nesting and non-nesting responses such as flush frequency and distance, alert behavior, and response duration were measured during manipulated and non-manipulated trials. There was no significant difference in reproductive success or the number of young fledged between trials. As stimulus distance decreased, Mexican spotted owl flush frequency increased, and no spotted owl flushes were recorded when noise stimuli were more than 344 feet away. Flush rates in response to helicopters did not differ between non-nesting and nesting seasons and spotted owls did not flush when the sound exposure level (SEL) for helicopters was less than 92 dBA (Delaney et al. 1999). Furthermore, Johnson and Reynolds (2002) reported that Mexican spotted owls exhibited little to no response to F-16 aircraft flying at low altitudes. Considering that noise emissions from the MQ-1 and MQ-9 aircraft would be far less than those of military helicopters or F-16 jets (actually less than a Cessna 172), the UAS would typically operate at altitudes at 6,000 feet AGL and higher, and most of the UAS operations would occur in R-5111 C/D, ACC has determined that the proposed UAS operations may affect, but would not adversely affect Mexican spotted owls.

According to U.S. Army (2005), system-wide surveys were conducted between 1996 and 2002, which resulted in no observations of aplomado falcons; however, individuals were reported in 1991 and in 2005. After the latter observation was made, follow-up surveys were conducted, which indicated that the falcon was most likely a transient juvenile. As indicated by U.S. Army (2005), most UAS activities would occur within established launch and impact areas, where

vegetation communities are considered unsuitable for aplomado falcons. The proposed construction and renovation activities would also occur within or near developed areas on Holloman AFB and, thus, would not affect suitable falcon habitat. Therefore, UAS activities would not likely jeopardize the northern aplomado falcon.

Gulf South Research Corporation (GSRC) performed a database query of Database Query for Otero County (BISON-M) and found eight endangered species and 15 threatened species listed for the State of New Mexico. The beddown renovation or construction would primarily occur on previously disturbed ground or buildings and would not be expected to impact any New Mexico endangered, threatened or sensitive biological species. Construction of the proposed taxiway would not be expected to impact these species, as none have been reported to occur within the airfield during previous surveys. Overflight noise and impacts of live and inert munitions would not cause significant impacts to biological resources as a result of the project.

Impacts to biological resources from noise associated with flight operations would be less than those of previous flight operations, since the MQ-1 and MQ-9 do not generate the noise levels of other training aircraft currently assigned to the installation. The MQ-1 and MQ-9 do not operate at super sonic speeds and thus, do not create sonic booms. The addition of UAS aircraft training operations would result in no or negligible increases of the noise signature at Holloman AFB and surrounding areas (Holloman AFB 2008). The *49 FW Bird Aircraft Strike Hazard Plan* (1998) identifies local flying procedures to keep aircraft from direct overflights of the LHWC area. Adhering to this plan, no migratory or Federal or state protected birds would be impacted by aircraft noise and bird strikes in LHWC.

Training activities that include munitions exercises would utilize GBU-12 and GBU-38 inert munitions. The inert munitions do not explode and would not create explosive noise emissions and little disturbance in the impact areas. It is possible that a wildlife species could be struck by an inert munition or fall into a impact crater caused by an inert munition; however, the loss of an individual would not be a significant impact to the population as a whole. Only the Red Rio Range would be used for live munitions, which is an established live munition target area. Holloman AFB conducted surveys for candidate, threatened, and endangered plants within the Primary Impact Areas (PIA) and made cursory observations along roads in other portions of the range. Nineteen populations of pineapple cactus (*Neolloydia intertexta* var. *dasyacantha*) were identified within the PIA. Pineapple cactus is a state listed L4 species. It was considered for Federal listing but was determined to be too common within in New Mexico (U.S. Air Force 2000).

During a brief survey of Oscura Bombing Range in 1996, no candidate, threatened, or endangered species were identified within the impact areas. Bird, mammal, and reptile fauna are similar to those at the adjacent Red Rio Bombing Range. Although a diverse assemblage of fauna is found within this region, the species are quite common throughout New Mexico. Furthermore, these target areas are used frequently by Holloman AFB for practice missions and biological resources in this area would not be significantly impacted as compared to the No Action Alternative (U.S. Air Force 2000).

Holloman AFB uses several tools to reduce impacts to biological resources such as migratory birds, raptors, and other wildlife species:

- The BAM program is a predictive model using GIS technology to analyze and avoid bird habitat, migration routes, and breeding characteristics.

- The AHAS tracks the movements of birds within the airspace (Air Force Safety Center 2008).
- The Holloman AFB BASH plan establishes procedures to minimize both bird and other wildlife strike hazards at the base and low level areas (U.S. Air Force 2006)

These tools are described in detail in Section 4.10.2. Typical operating altitudes of the aircraft would be 5,000 to 25,000 feet AGL for the MQ-1 and 15,000 to 35,000 feet AGL for the MQ-9. BASH would be most likely during climbing and descent of the aircraft.

4.5.3 Edwards AFB Alternative

The North Base and Bailey Elementary School areas of Edwards AFB are previously developed and construction activities at these locations would not impact any natural vegetation communities and have little impact on other biological resources. There could be some disruption to wildlife that is associated with the developed areas such as mice, rats, bats, and birds. These animals would likely remain in the buildings or move to adjacent uninhabited buildings and structures as project activities increase. Because the proposed beddown facilities would occur within developed areas and away from the Piute Ponds and the Branch Memorial Park Pond, no wetland communities or freshwater aquatic communities would be impacted by the proposed MQ-1/MQ-9 FTU-2 beddown.

Of the three Federally-listed and 14 other species of interest that occur on or within 1 mile of Edwards AFB (see tables 3-9 and 3-10), only four species have possible habitat at the school house area. The four sensitive species are the desert tortoise, burrowing owl, Mohave ground squirrel, and desert cymopterus.

The beddown renovation or construction at the North Base and Bailey Elementary School would occur on previously disturbed ground and would not be expected to impact any endangered, threatened or sensitive biological species at these sites. The school house area is mainly native vegetation and could be occupied by the desert cymopterus, desert tortoises, burrowing owls or Mohave ground squirrels. If Edwards AFB is selected for the beddown, formal Section 7 consultation with the U.S. Fish and Wildlife Service would be initiated for the desert tortoise and protocol surveys would be completed prior to construction at the site. Relocation of plants or animals would take place, to the extent practicable, for any state-listed species of interest that are recorded at the site.

4.6 Earth Resources

4.6.1 No Action Alternative

The No Action Alternative would create no impacts to earth resources. No impacts on climate, topography and geomorphology, geology, or soils at either Holloman AFB or at Edwards AFB would occur.

4.6.2 Holloman AFB Alternative

The Proposed Action would have no impact on climate, topography and geomorphology, or geology. The impact on earth resources created by flying MQ-1 and MQ-0 aircraft over the desert and mountainous terrain would be less than significant.

Insignificant soil disturbance to 16 acres would result from the construction of a new taxiway and existing roadway repair. The new taxiway would be constructed in an already developed/managed area parallel to and east of Runway 16/34 and perpendicular to Runway

7/25. Soils in the new taxiway area consist of Holloman-Gypsum land-Yesum soil complex. No prime farmland soils would be disturbed. BMPs would be instituted during taxiway construction and roadway repair to prevent or control erosion.

MQ-1/MQ-9 training activities would not significantly impact soils on WSMR. All UAS takeoff and landing activities would occur on established taxiways and runways resulting in no new disturbance to soils. Occasionally, soils may be impacted by recovery activities; upper soil horizons, and in particular desert soil crusts, would be impacted during some UAS recovery operations that require the use of wheeled vehicles. To minimize potential impacts to soils during recovery operations, efforts should be made to locate downed UASs with helicopters, all-terrain vehicles (ATVs) and pedestrian patrols. Larger vehicles used in recovery efforts should take the most direct route possible to the downed UAS. Efforts should be made to stay on established roads to the greatest extent practicable, before driving off-road to recover UASs. All recovery operations will follow established protocol.

MQ-1/MQ-9 weapons training would be confined to established impact areas on WSMR and McGregor Range. The release of weapons on targets and on the ranges are a normal occurrence and would have a less than significant impact on soils at either installation.

4.6.3 Edwards AFB Alternative

Beddown of the FTU at Edwards AFB would have no impact on climate, topography and geomorphology, or geology. Aircraft emissions would not contribute significantly to climate change (see Section 4.8).

New construction within the North Base and school house areas would impact soils that could be considered prime farmland if irrigated. However, no agricultural fields are allowed on Edwards AFB (Edwards AFB 2008); thus, these soils are not considered prime farmlands. BMPs would be instituted during any construction activities to control erosion and sedimentation.

The release of weapons on targets and on the ranges are a normal occurrence and would have a less than significant impact on geology and soils. The impact on earth resources created by flying UASs over the desert and mountainous terrain would be the same as or less than any other flight vehicle.

MQ-1/MQ-9 training activities and recovery efforts at Edwards AFB would have similar impacts on soils as that described for Holloman AFB.

4.7 Water Resources

4.7.1 No Action Alternative

Under the No Action Alternative, the conditions at Holloman AFB and Edwards AFB would not change. No temporary or permanent impacts to water demand or storm water runoff would occur. The long-term demand on regional water supplies would remain the same.

4.7.2 Holloman AFB Alternative

Under the Proposed Action, up to 16 acres of soil would be cleared of vegetation due to taxiway construction and, consequently, susceptible to erosion during construction activities. The new facilities would be expected to increase the amount of impervious surfaces within the Tularosa Basin. The Tularosa Basin could be affected by storm water runoff and suspended sediments resulting from precipitation events during the construction period. Since the construction area

would be greater than 1 acre, a NPDES Storm Water Discharge permit would be required prior to construction. This permit would require that a SWPPP be prepared and a Notice of Intent (NOI) to be filed with the NMED and USEPA. Implementation of specific erosion and sedimentation controls and other BMPs, such as the strategic placement of hay bales and silt fence, would limit the amount of erosion that occurs on site and restrict potential impacts to surface water during the construction phase of the Proposed Action. Incorporation of post-construction storm water controls within Holloman AFB's existing SWPPP for base-wide facilities and operations would minimize long-term impacts to surface waters and allow for groundwater recharge. Therefore, no significant impacts to groundwater or surface waters would occur as a result of an increase of impervious surfaces under the Proposed Action.

Construction of the Proposed Action would increase demands on water supplies during the construction period. Water would be needed for a variety of construction activities including, but not limited to drinking water supply for construction crews, wetting construction sites for dust suppression, and concrete mixing. These increases would be temporary and minimal. The water use during construction activities to control dust would equal approximately 1 acre-foot per year. Water usage would increase by 50 gallons per person per day as a result of the Proposed Action (Gleick 1996), as described previously in Section 4.2.2.2. No deficit would occur to the installation water supply as a result of the increased demand; thus, no significant impacts are expected.

4.7.3 Edwards AFB Alternative

It is not currently known how many acres of undeveloped soils would be cleared of vegetation and consequently susceptible to erosion during construction activities at Edwards AFB. Any new facilities, if required, would be constructed at North Base and Main Base. Therefore, impacts to the Lancaster and North Muroc subbasins would occur as a result of the Proposed Action. The new facilities would increase the amount of impervious surfaces within the Lancaster and North Muroc subbasins. The subbasins could be affected by storm water runoff and suspended sediments resulting from precipitation events during the construction period. Since the construction area would be greater than 1 acre, a NPDES Storm Water Discharge permit would be required prior to construction. This permit would require that a SWPPP be prepared and a NOI to be filed with the CWRB and USEPA. Implementation of specific erosion and sedimentation controls and other BMPs, such as the strategic placement of hay bales and silt fence, would limit the amount of erosion that occurs on site and restrict potential impacts to the Lancaster and North Muroc subbasins during the construction phase. Therefore, no significant impacts to surface waters during construction activities would occur. Incorporation of post-construction storm water controls within Edwards AFB's existing SWPPP for base-wide facilities and operations would minimize long-term impacts to surface waters and allow for groundwater recharge. Therefore, no significant impacts to groundwater or surface waters would occur as a result of an increase of impervious surfaces under the Proposed Action.

In 1998, Edwards AFB groundwater wells produced a total of 787,869,000 gallons of drinking water from eight wells and 13,491,300 gallons of non-potable water from three wells. In 1998, AFRL groundwater wells produced a total of 5,900,000 gallons of drinking water. The average daily water demand on the base has been reported as 4.0 MGD (approximately 4,500 acre-feet per year), which normally can be supplied by imported surface water. However, the demand is much higher in the summer. Peak summer use is approximately 12 MGD. Therefore, groundwater pumpage is still required (Edwards AFB 2002a).

Construction of the beddown facilities and operational water demands at Edwards AFB would be similar, although slightly higher that described for Holloman AFB. The increase would occur

only during the construction period since several more new facilities would be required at Edwards AFB, as compared to Holloman AFB. The addition of new staff and students would have negligible impacts to the water supply at Edwards AFB.

4.8 Air Quality

4.8.1 No Action Alternative

The No Action Alternative would not produce air emissions and would not impair the air quality in the region of either Holloman AFB or Edwards AFB.

4.8.2 Holloman AFB Alternative

Temporary and minor increases in air pollution would occur from the use of construction equipment (combustible emissions) and the disturbance of soils (fugitive dust) during construction of the new taxiway, access roads and new facilities. The following paragraphs describe the air calculation methodologies utilized to estimate air emissions produced by the Proposed Action. Fugitive dust emissions were calculated using the emission factor of 0.19 tons per acre per month (Midwest Research Institute [MRI] 1996), which is a more current standard than the 1985 PM-10 emission factor of 1.2 tons per acre-month presented in AP- 42 Section 13 Miscellaneous Sources 13.2.3.3 (USEPA 2001).

EPA's NONROAD Model (USEPA 2005) was used, as recommended by USEPA's *Procedures Document for National Emission Inventory, Criteria Air Pollutants, 1985-1999* (USEPA 2001), to calculate emissions from construction equipment. Combustible emission calculations were made for standard construction equipment, such as front-end loaders, backhoes, bulldozers, and cement trucks. Assumptions were made regarding the total number of days each piece of equipment would be used, and the number of hours per day each type of equipment would be used.

Construction workers would temporarily increase the combustible emissions in the airshed during their commute to and from the project area. Emissions from delivery trucks contribute to the overall air emission budget. Emissions from delivery trucks, construction worker commuters traveling to the job site were calculated using the USEPA MOBILE6.2 Model (USEPA 2005a, 2005b and 2005c).

The total annual air quality emissions were calculated for the construction activities (worst case scenario, year 2012) to compare to Federal and state *de minimis* thresholds. Summaries of the total emissions for the construction of the Proposed Action are presented in Table 4-1. Details of the analyses are presented in Appendix C.

Several sources of air pollutants contribute to the all over air impacts of the construction project. The results of air calculations in Table 4-1 included emissions from:

1. Combustible engines of construction equipment
2. Construction workers commute to and from work
3. Supply trucks delivering materials to construction site
4. Fugitive dust from job site ground disturbances

Table 4-1. Total Annual Air Emissions (tons/year) from the Proposed Construction at Holloman AFB verses the *De minimis* Threshold Levels

Pollutant	Total (tons/year)	*De minimis* Thresholds (tons/year) [1]
CO	13.70	100
VOCs	2.42	100
NOx	17.72	100
PM-10	8.25	100
PM-2.5	2.05	100
Sulfur Dioxide (SO_2)	2.17	100

Source: 40 CFR 51.853 and GSRC model projections.
1. Note that Otero County is in attainment for all NAAQS.

As can be seen from the table above, the proposed construction activities at Holloman AFB would not exceed Federal or state *de minimis* thresholds; thus these activities would not require a Conformity Determination, even if Otero County exceeds Federal and state standards and is designated as an non-attainment area. As there would be no violations of air quality standards and no conflicts with the state implementation plans, there would be no significant impacts on air quality from the implementation of the Proposed Action.

The interiors of some buildings may be required to be remodeled. If the structures scheduled to be renovated are older than 40 years, the buildings would be inspected for materials containing asbestos. If the structures do contain asbestos, an Asbestos Dust Mitigation Plan would be implemented to mitigate the exposure and migration of the asbestos. During the construction of the Proposed Action, proper and routine maintenance of all vehicles and other construction equipment would be implemented to ensure that emissions are within the design standards of all construction equipment. Dust suppression methods would be implemented to minimize fugitive dust. By using these environmental design measures, air emissions from the construction of the Proposed Action would be temporary and would not significantly impair air quality in the region.

Holloman AFB would experience an increase in the number of students and staff due to the implementation of the Proposed Action. These persons would increase air emissions in Otero County during their commute to work and daily traveling events. In addition, daily operations include air pollutant emissions from aircraft. Both aircraft operations and student and staff commuting would contribute to the long-term air budget of Otero County. Air emissions from the MQ-1/MQ-9 FTU-2 training operations were estimated during year 2019 (full operation mode). Emissions factors for the MQ-1 and MQ-9 were assumed to be similar to the UAS emission factors in the Edwards AFB 2006 EA (U.S. Air Force 2006a). These aircraft were used as surrogates for consideration in the air quality analysis calculations (Appendix C).

The USEPA typically uses 3,000 feet AGL as the default mixing height that inhibits the rapid vertical transfer of air. Pollutants emitted above the mixing height become diluted in the very large volume of air in the troposphere before they are slowly transported down to ground level. These emissions above 3,000 AGL have little or no effect on ambient air quality. Therefore, air quality impacts below 3,000 feet AGL are the emphasis of the daily air quality assessment analysis. The majority of emissions from criteria air pollutants, or precursors thereof, for the Proposed Action are expected to occur above the mixing height of 3,000 feet AGL. Approximately 5 percent of the flight time for consolidated mission events would generate

emissions below 3,000 feet AGL and would be associated with takeoff and landing at Holloman AFB (95th Air Base Wing 2008). The calculations for the on-going aircraft and commuter emissions are presented in Appendix C and are summarized in Table 4-2 below.

Table 4-2. Annual Air Emissions Produced by the Addition of the MQ-1 and MQ-9 Flight Training and Increase in Auto Traffic at Holloman AFB

Pollutant	Total (tons/year)	*De minimis* Thresholds (tons/year) [1]
CO	3.03	100
VOCs	1.42	100
NOx	3.32	100
PM-10	0.48	100
PM-2.5	0.12	100
Sulfur Dioxide (SO_2)	NA	NA

Source: 40 CFR 51.853 and GSRC model projections.
1. Note that Otero County is in attainment for all NAAQS.

On-going air emissions from the Proposed Action are expected to increase due to the implementation of the MQ-1 and MQ-9 training activities and the new staff and students. The Conformity Rule is not applicable because Otero County is in attainment for all NMAAQS and NAAQS.

Historically, the aviation sector is responsible for about 2.6 percent of the greenhouse gas emissions in the Nation, with the U.S. military contributing only a small portion. Military aviation used approximately 0.5 percent of the U.S. aviation fuel in 2000. Non-aviation transportation emits 25 percent, industry 41 percent, and other U.S. sources emit 31 percent of the greenhouse gases (USEPA 2006a). Aircraft activities will generate small amounts of greenhouse gasses primarily from emission products from internal combustion engines. However, these amounts are negligible and will not significantly contribute to greenhouse gasses. Aircraft activities will not significantly affect the climate on a global or regional scale. The Proposed Action would not significantly impact the air emissions to would result from the operation of the Proposed Action.

4.8.3 Edwards AFB Alternative

Temporary and minor increases in air pollution would occur from the use of construction equipment (combustible emissions) and the disturbance of soils (fugitive dust) during construction and renovation of the new facilities. The total annual air quality emissions were calculated for the construction activities (worst case scenario, year 2012) to compare to Federal and state *de minimis* thresholds. Summaries of the total emissions for the construction of the Proposed Action are presented in Table 4-3; details are presented in Appendix C.

Table 4-3. Total Annual Air Emissions (tons/year) from the Proposed Construction Activities at Edwards AFB verses the *De minimis* Threshold Levels

Pollutant	Total (tons/year)	*De minimis* Thresholds (tons/year) [1]
CO	12.42	100
VOCs	2.06	50
NOx	13.46	50
PM-10	3.39	70
PM-2.5	1.31	100
Sulfur Dioxide (SO_2)	1.62	100

Source: 40 CFR 51.853 and GSRC model projections.
1. Note that Kern County and the San Joaquin Valley, San Bernardino and Mojave Desert air basin are in serious non-attainment for O_3 and PM-10 and moderate non-attainment for PM-2.5.

Daily operations would result in air pollutant emissions from aircraft operations and personal automobile commutes. Both would contribute to the long-term air budget of the local Federal and state air sheds. Air emissions from the MQ-1/MQ-9 FTU-2 training operations were estimated during year 2019 (full operation mode). Emissions factors for the MQ-1 and MQ-9 were assumed to be similar to the UAS emission factors in the Edwards AFB 2006 EA (U.S. Air Force 2006a). These aircraft were used as surrogates for consideration in the air quality analysis calculations. The calculations for the on-going aircraft and commuter emissions are presented in Appendix C and are summarized in Table 4-4 below.

Table 4-4. Annual Air Emissions Produced by the Addition of the MQ-1 and MQ-9 Flight Training and Increase in Auto Traffic at Edwards AFB

Pollutant	Total (tons/year)	*De minimis* Thresholds (tons/year) [1]
CO	92.22	100
VOCs	10.84	50
NOx	10.20	50
PM-10	0.51	70
PM-2.5	0.15	100
Sulfur Dioxide (SO_2)	NA	100

Source: 40 CFR 51.853 and GSRC model projections.
1. Note that Kern County and the San Joaquin Valley, San Bernardino and Mojave Desert air basin are in serious non-attainment for O_3 and PM-10 and moderate non-attainment for PM-2.5.

Historically, the aviation sector is responsible for about 2.6 percent of the greenhouse gas emissions in the Nation, with the U.S. military contributing only a small portion. Military aviation used approximately 0.5 percent of the U.S. aviation fuel in 2000. Non-aviation transportation emits 25 percent, industry 41 percent, and other U.S. sources emit 31 percent of the greenhouse gases (USEPA 2006a). Aircraft activities will generate small amounts of greenhouse gasses primarily from emission products from internal combustion engines. However, these amounts are negligible and will not significantly contribute to greenhouse gasses. Aircraft activities will not significantly affect the climate on a global or regional scale.

Air emissions produced by construction activities would be less at Edwards AFB than Holloman AFB due to the fact that construction of a new aircraft taxiway would not be required at Edwards AFB. However, the daily commutes of 600 personnel would be greater at Edwards AFB base

because housing in local communities is much further away. Air quality calculations indicate that daily air emissions from the MQ-1/MQ-9 FTU-2 beddown would not exceed annual Federal and state *de minimis* thresholds for NAAQS and CAAQS, respectively.

Annual emissions from both the construction and ongoing operations would be below *de minimis* thresholds. In addition, the emissions of ozone precursors, NOx, VOCs and PM-10, would be less than 1.0 percent of the total Kern County inventory (see Appendix C for calculations). An air conformity determination would not be required if the Edwards AFB is selected to be the beddown site for the MQ-1/MQ-9 FTU-2 training facility. No significant air quality impacts would result from daily operation of the Proposed Action at Edwards AFB.

4.9 Solid and Hazardous Materials and Waste

4.9.1 No Action Alternative

Under the No Action Alternative, there would be no additional facilities constructed at either Holloman AFB or at Edwards AFB, and no additional use or storage of hazardous materials would occur; therefore, there would be no impacts.

4.9.2 Holloman AFB Alternative

The potential exists for POL storage and use at the construction areas to maintain and refuel construction equipment during construction activities; however, these activities would include primary and secondary containment measures. Clean-up materials (e.g., oil mops) would also be maintained at the site to allow immediate action in case an accidental spill occurs. Drip pans would be provided for stationary equipment to capture any POL accidentally spilled during maintenance activities or leaks from the equipment. In addition, a site-specific SPCCP would be in place prior to the start of construction, and all personnel would be briefed on the implementation and responsibilities of this plan.

Some activities associated with the operation of aircraft and maintenance at the beddown site would generate small quantities of hazardous waste. Used POLs would be generated during the repair and maintenance of aircraft. An Initial Accumulation Point would be established, if required, and hazardous wastes would be disposed of according to the Holloman AFB Hazardous Waste Management Plan. Existing storage capacity for JP-8 would be used for the MQ-9 deployment; and two 8,000 gallon above-ground storage tanks for AvGas would be constructed to support the MQ-1 deployment. The above-ground storage tanks would employ secondary containment measures large enough to accommodate any spill, and the Holloman AFB operational SPCCP would be implemented if a spill was to occur to ensure the appropriate response to any fuel spills. There are no current IRP sites that would pose an issue in the design, construction, or operation of the proposed facilities.

AFFF used for fire suppression at the engine repair, fuel storage and flight line locations would be stored in areas that included secondary containment measures. Therefore, any spill of AFFF would be contained on site and would not enter water courses or into storm drains and the wastewater treatment plant. In the event of a fire and the use of AFFF for fire suppression, excess AFFF would be vacuumed or pumped into storage containers, small quantities would be absorbed with absorbent materials, and all excess AFFF would be disposed of following state and Federal regulations.

The hazardous waste generated by operations of the MQ-9 and MQ-1 deployment would be similar to wastes currently generated by other aircraft operations at Holloman AFB, and the additional amount generated would be very small in comparison to current amounts generated

on the base. Therefore, the Proposed Action would not result in a significant hazard to the public or environment regarding the transport, use, or disposal of hazardous materials or wastes.

4.9.3 Edwards AFB Alternative

The impacts on solid and hazardous materials or wastes from the MQ-1/MQ-9 FTU-2 beddown at Edwards AFB would be the same or similar as described for Holloman AFB.

4.10 Safety and Occupational Health

4.10.1 No Action Alternative

Under the No Action Alternative, there would be no potential for Class A mishaps at either Holloman AFB or Edwards AFB as there would be no beddown of the MQ-1 or MQ-9 aircraft. However, safety issues associated with BASH, ground and maintenance operations, and development of munitions, would still occur at Creech AFB.

4.10.2 Holloman AFB Alternative

There would be no significant increase in safety hazards associated with the proposed operations at Holloman AFB. Daily operations and maintenance activities are performed in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by AFOSH requirements. Civilian contractors would be contractually governed by their companies' health and safety plans. Detailed SOPs have been established to fulfill many health and safety requirements. Personnel involved with different test equipment would be instructed on the use of the equipment and personal PPE.

No significant hazard from soil or groundwater contamination above NMED site screening levels would be ascribed to workers involved in the construction of a new taxiway or runway repair (see Sections 3.9 and 4.9).

Under the beddown at Holloman AFB, there would be a potential for Class A mishaps, but this potential would be considered less than significant. MQ-1 and MQ-9 flight training operations are conducted in restricted areas, ATCAAs, and MOAs (see Section 3.12 and 4.12) and the pre-designated landing areas/procedures (described previously in Section 3.10) would alleviate any potential effects to non-military resources.

Hazard from firing of munitions from the aircraft is also considered less than significant. The operating airspace is already designed to support live weapons training. WSMR is engaged in the on-going test and evaluation of a variety of DoD missile flight systems and related equipment. Standardized procedures have been developed on the range for the planning, safety evaluation, and conduct of flight testing. The Flight Safety Office evaluates the flight hazards from all types of weapon systems to protect the public, personnel, and facilities from flight hazards. Any program involving missile flight safety must undergo a thorough safety review, a risk analysis, and preparation of SOPs. The documentation is reviewed by project directors and WSMR Missile Flight Safety. Missile firings cannot be scheduled or conducted without the final approval of the WSMR Missile Flight Safety Office (U.S. Army Space and Missile Defense Command 2002). The U.S. Army Combined Arms Support Battalion (USACASB) provides the management, control, maintenance, and operation of the Fort Bliss field training areas, including McGregor Range. These procedures can be reviewed at the following URL address: (http://www.globalsecurity.org/military/facility/fort-bliss.htm). It is anticipated that each student would conduct one air-to-ground operation during their training. Most air-to-ground training would be simulated, where nothing is released from the aircraft.

UXO is known to exist throughout WSMR and poses a potential health risk to testing personnel and visitors. UXO may lie on the ground surface or may have penetrated the surface either by land or in the water. Regulation of UXO is under DoD 6055.9-STD Ammunition and Explosives Safety Standards (February 2008), where it designates a uniform safety standard applicable to ammunition and explosives and to both associated and unassociated personnel (general public) and property (private property) and the WSMR UXO Hazards and Munitions Management (UHMM). The UHMM has published the UXO Hazards and Munitions Management Plan. It describes the policies and responsibilities of each organization on WSMR. Under WSMR regulations, test personnel are instructed on the procedures on the discovery of UXO (U.S. Army 2005).

In the event of an aircraft going down within the WSMR, there would be the potential for the recovery crew to encounter UXO and hazardous materials. Under WSMR regulations, test personnel are instructed on the procedures on the discovery of UXO (U.S. Army 2005). The Hellfire missile (if they are used in the future) has several variants, which contains a high explosive shaped charge warhead and a solid propellant rocket motor. The GBU-12 utilizes a 500-pound general purpose warhead with Tritonal, and PBXN-109 (192 pounds). Any ordnance associated with the aircraft would be retrieved by qualified explosive ordnance and disposal (EOD) personnel. Other support personnel would have received UXO training prior to being allowed entry into the test areas.

Hazardous materials associated with the aircraft are negligible as the aircraft are constructed from “off-the-shelf” materials. Graphite construction constitutes 90 percent of the MQ-1’s relatively light weight of 2000 pounds and approximately 4,900 pounds for MQ-9. A Rotax four cylinder motor with a 6-foot diameter propeller powers the MQ-1. The MQ-9 is powered by a single 900-horsepower turboprop engine. The MQ-1 does not contain hydraulics or pneumatics. An alternator provides in-flight electrical power to charge the nickel-cadmium batteries, on board electronics and sensors (U.S. Air Force 1996). Exposure of recovery crews to hazardous materials, in the event of an aircraft going down within WSMR or McGregor Range, are considered less than significant. No significant impacts relating to exposure to hazardous and toxic materials/wastes from the test and maintenance programs are expected due to the minute amount of waste generated.

The BAM program objective was to develop a predictive bird avoidance model using GIS technology as a key tool for analysis and correlation of bird habitat, migration, and breeding characteristics, combined with key environmental, and man-made geospatial data. The risk in the BAM display is based on 30 years of historical data. The BAM is also available online (http://www.usahas.com/BAM/home/).

Using NEXRAD (WSR-88D) Weather Radars to track the movements of birds, the AHAS represents the most comprehensive method of remote sensing of birds today. These radars were originally built to track storm cells and chart precipitation returns. Now, they are being used to keep planes away from birds. The system actually takes the weather out of the picture, leaving biological targets. AHAS uses the radars to monitor bird activity in near real-time and as a feedback tool for the forecasts that AHAS produces for the flight crews. It takes weather into account and calculates where the larger birds (e.g., geese, vultures, hawks) are going to be. The risk in the AHAS table is based on the latest NEXRAD and weather data. AHAS calculates risk by measuring the number of bird strikes in a particular area, and the average mass of the birds from the FAA database. AHAS also incorporates weather radar data from NEXRAD, historical information (BAM) and predictive models to determine current bird activity. AHAS provides strike risk assessment for VR Routes, IR Routes, Ranges, MOAs and Military Airfields.

The AHAS is online (http://www.usahas.com/). Coverage includes the entire continental U.S. (Air Force Safety Center 2008).

BASH is considered less than significant. The Holloman AFB BASH plan establishes procedures to minimize both bird and other wildlife strike hazards at the base and low level areas utilized by the base assigned aircraft (Holloman AFB General Plan Update). Local flying procedures avoid direct over flight of areas where migratory birds (e.g., Lake Holloman Wetland Complex Area) are predominantly located (U.S. Air Force 2006) and the AHAS and BAM help predict where birds would be located in the operations area. Typical operating altitudes of the aircraft would be 5,000 to 25,000 feet AGL for the MQ-1 and 15,000 to 35,000 feet AGL for the MQ-9. BASH would be most likely during climbing and descent of the aircraft.

4.10.3 Edwards AFB Alternative

Potential safety and occupational health impacts of the MQ-1 and MQ-9 at Edwards AFB would be similar to those described for the beddown at Holloman AFB.

Ground operations would be similar to those at Holloman AFB and would be subject to the same rules and regulations, and operating procedures. Storage and handling of ordnance would be subject to the same rules and regulations as at Holloman AFB. The Edwards AFB BASH plan establishes procedures to minimize both bird and other wildlife strike hazards at the base and low level areas utilized by the base assigned aircraft.

Range users are required by Edwards AFB to demonstrate, through risk modeling, that the lowest possible risk is achieved, consistent with AFFTC mission requirements and risk guidance. The AFFTC Chief of Safety has responsibility for approving the proposed flight plans and flight safety criteria. The AFFTC Commander has final authority and responsibility for the safety of the proposed action.

The handling and storage of the munitions is conducted in accordance with the explosive safety procedures contained in Air Force Manual 91-201, *Explosive Safety Standards*. Munitions are stored and handled on the flight line in specified areas subject to strict management. Currently, PB-13 is the only target site on Edwards AFB cleared for the use of up to 500 pounds of net explosive weight–armed munitions (U.S. Air Force 2006a). UXO handling and safety is governed by the same rules and regulations as at all DoD facilities.

4.11 Noise

4.11.1 No Action Alternative

The implementation of the No Action Alternative would not impact the noise environment at Holloman AFB or Edwards AFB or the land uses below the training airspace.

4.11.2 Holloman AFB Alternative

4.11.2.1 Construction Noise

The installation of new facilities and taxiway and renovation of existing buildings would require the use of common construction equipment. Table 4-5 describes noise emission levels for construction equipment which range from 76 dBA to 84 dBA at a distance of 50 feet (Federal Highway Administration 2007 [FHWA] 2007).

Table 4-5. A-Weighted (dBA) Sound Levels of Construction Equipment and Modeled Attenuation at Various Distances[1]

Noise Source (2)	50 feet	100 feet	200 feet	500 feet	1000 feet
Backhoe	78	72	68	58	52
Crane	81	75	69	61	55
Dump truck	76	70	64	56	50
Excavator	81	75	69	61	55
Front end loader	79	73	67	59	53
Concrete mixer truck	79	73	67	59	53
Pneumatic tools	81	75	69	61	55
Bull dozer	84	78	72	64	58
Generator	81	75	69	61	55

Source: FHWA 2007 and GSRC

1. The dBA at 50 feet is a measured noise emission (FHWA 2007). The 100 to 1,000 foot results are GSRC modeled estimates using Caltran's (1998) noise attenuation model.
2. Noise emissions were measured while the source was operating.

Assuming the worst case scenario of 84 dBA (bulldozer at 50 feet), the noise model projected that noise levels of 84 dBA from a point source (i.e., bull dozer) would have to travel 450 feet before the noise would be attenuated to an acceptable level of 65 dBA for residential neighborhoods (U.S. Housing and Urban Development 1984). To achieve an attenuation of 84 dBA to a normally unacceptable level of 75 dBA, the distance from the noise source to the receptor is 140 feet.

The Option A site, where construction activities would occur, is currently exposed to sound levels of 70 dBA to 75 dBA (Holloman AFB 2008). Most of the construction would involve renovating existing buildings; however, a new taxiway would be constructed as part of the Proposed Action. The taxiway construction would involve the use of heavy equipment. The taxiway project corridor is located over 1,200 feet from the closest office building. Noise emissions of 84 dBA would attenuate to 56 dBA by the time they traveled 1,200 feet and well within the base boundaries. Therefore, noise emissions from construction activities would not impact sensitive noise receptors (office buildings) in the area and would have no effect on the general public off-base.

4.11.2.2 Operational Noise

Aircraft operations would include 2,880 MQ-1 and MQ-9 sorties per year. Noise emissions would occur during the takeoff, flight operations, and touch down of the aircraft. All the flights would be conducted within Holloman AFB, Ft. Bliss or WSMR air space and area ATCAAs and in the future could include MOAs. Flight operations would occur primarily between 0700 and 2200. Once every 6 weeks, there would be night time flights (M-F) between 2200 and 0700. Out of the 2,880 sorties, night sorties would equal approximately 480 per year.

Typical operating altitudes of the aircraft would be 5,000 to 25,000 feet AGL for the MQ-1, and 15,000 to 35,000 feet AGL for the MQ-9. At a 5,000 feet AGL altitude, the noise emissions from the MQ-1 and MQ-9 aircraft would be similar to that of single engine propeller aircraft such as a Cessna 172.

The noise emissions during take off and landing of the MQ-1 and MQ-9 would be would significantly less than the aircraft currently assigned to or used at the installation. The MQ-1 and MQ-9 do not fly at super sonic speeds and thus, do not create sonic booms. The addition of the MQ-1 and MQ-9 training operations would result in no or negligible increases of the noise signature at Holloman AFB or surrounding areas.

Training activities that include munitions exercises would utilize GBU-12 and GBU-38 inert munitions. In addition, the aircraft could also carry M-36 (inert Hellfires), but these are not released from the aircraft. The inert munitions do not explode and would not create explosive noise emissions. Noise emissions from on-going operations of the MQ-1 and MQ-9 would not create a significant impact to the existing noise environment at Holloman AFB or surrounding areas. The exercises utilizing live ordnance would employ the Red Rio Range, while Oscura and McGregor Ranges would be used for inert munitions delivery. Live fire could occur at Red Rio Range, but would occur at distances far enough away to not impact sensitive noise receptors beyond the installation boundaries.

4.11.3 Edwards AFB Alternative

4.11.3.1 Construction Noise

Initially, existing facilities would accommodate the MQ-1 and MQ-9 training and exercise activities. Eventually, as the program ramps up, new facilities would have to be installed to accommodate the growing numbers of students and aircraft. Construction equipment noise emissions, similar to those described for the Holloman AFB Alternative, would be produced during construction of the new buildings. With exception of the school house area, the proposed construction sites are within the existing 65 dBA noise contour (Edwards AFB 2005). The impact of construction noise inside the 65 dBA noise contour would be negligible.

The school house construction site is outside the Edwards AFB 65 dBA contour (Edwards AFB 2005), so noise emissions from construction equipment during the construction of the new school house may temporarily increase ambient noise levels immediately adjacent to the construction site. Assuming the worst case scenario of 84 dBA, the noise model projected that noise levels of 84 dBA from a point source (i.e., bull dozer) would have to travel 450 feet before the noise would be attenuated to an acceptable level of 65 dBA. The closest buildings to the school house construction site, on Methusa Avenue, are approximately 420 feet. The buildings may be temporarily exposed to construction noise emissions greater than 65 dBA. The noise emissions from construction equipment during the construction of the new schoolhouse would be short-term and minor.

4.11.3.2 Operational Noise

Noise emissions and operations from the proposed MQ-1 and MQ-9 on-going operations would be similar to those described for the Holloman AFB Alternative section. Noise emissions from Edwards AFB's existing jet training operations, such as the F-35 Joint Strike Fighter, F-22 Raptor, and RQ-4 Global Hawk produce a significantly greater noise signature than the MQ-1 and MQ-9. The addition of the proposed UAS training activities would produce a negligible impact on the current noise signature created by the existing aircraft operating at Edwards AFB. The implementation of the proposed MQ-1/MQ-9 FTU-2 beddown would not significantly impact the noise environment at Edwards AFB.

4.12 Airspace

4.12.1 No Action Alternative

Implementation of the No Action Alternative would have no effect on the airspace over Holloman AFB, Edwards AFB or the surrounding controlled airspace of either installation. However, airspace over Creech AFB would remain at near maximum capacity and the ability of the Air Force to meet its CAP mission would be threatened.

4.12.2 Holloman AFB Alternative

The Proposed Action would have no changes to the Controlled Airspace around Holloman AFB. The availability of the restricted airspace and ATCAAs has permitted Air Force training flexibility, and has enabled Air Force training consistent with airspace requirements for on-going research and development activities at WSMR and training missions at McGregor Range. Until 2007, operations at Holloman AFB totaled approximately 97,400 sorties annually. The F-22A replaced the F-117s at Holloman AFB in 2007/2008 and the overall annual operations were reduced by 11.5 percent to approximately 87,000 sorties (see Table 2-3). The MQ-1/MQ-9 sorties are expected to primarily use R-5111 airspace, particularly R-5111C and R-5111D. Table 4-6 presents the number of operations expected to occur for the MQ-1/MQ-9 training relative to the current number of operations occurring within the R-5111 complex. As other COAs are established or additional WSMR airspace is available, the MQ-1/MQ-9 training operations would expand into other airspace. Assuming each sortie results in two operations within the restricted airspace, up to 6,000 annual operations would be expected for the MQ-1/MQ-9 training missions. These operations would result in an increase of approximately 7 percent in the overall WSMR airspace, which would still be far less than the operations that occurred in 2007.

Table 4-6. Current Annual Operations in R-5111 vs. Expected MQ-1/MQ-9 Operations

Airspace Unit	Current Ops	MQ-1/MQ-9 Anticipated Ops
R-5111A	6,929	1,152
R-5111B	95	1,152
R-5111C	54	1,728
R-5111D	39	1,728

No supersonic flight would be associated with either aircraft, so no additional sonic booms would be experienced. The two high altitude jet routes that are used when the airspace is made available over WSMR would continue as under current conditions. No impacts to General Aviation and other civil aircraft operating around WSMR, Holloman AFB or McGregor Range would occur as a result of the Proposed Action.

4.12.3 Edwards AFB Alternative

The beddown of the MQ-1/MQ-9 aircraft would increase the number of sorties at Edwards AFB by 2,880 annually, which would impact airspace management and air safety in the R-2508 Complex and the surrounding FAA controlled airspace. The Air Force (95th Air Base Wing 2008) reported that there were 34,000 sorties that occurred in 2005, and 70,000 to 90,000 sorties that occurred during the late 1980s and 1990s. The number of sorties that occurred in 2008 at Edwards AFB was 9,600 (see Section 2.3.4), which equates to approximately 19,200 operations. Assuming that up to 6,000 MQ-1/MQ-9 annual operations would be required, Edwards AFB would experience an increase of nearly 31 percent. Still, these levels would be well below the operations that have occurred historically at Edwards AFB. Flight tests operating

in the R-2508 Complex (including restricted area R-2515) and transitioning outside of the R-2508 Complex would be accomplished in accordance with Air Force and FAA guidelines and regulations. Thus, the impacts on airspace management and air safety for aircraft flight operations would be less than significant and no conflicts with on-going test and training missions would be expected. Similar to the Holloman AFB alternative, no impacts to General Aviation or other civil aircraft operating in the controlled airspace above or surrounding Edwards would be adversely affected by the MQ-1 or MQ-9 training missions.

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SECTION 5.0
CUMULATIVE EFFECTS

5.0 Cumulative Effects

This section of the EA addresses the potential cumulative impacts associated with the implementation of the alternatives and other projects/programs that are planned for the region. The CEQ defines cumulative impacts as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). This section continues, "Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

USEPA suggests that analysis of cumulative impacts should focus on specific resources and ecological components that can be affected by the incremental effects of the proposed actions and other actions in the same geographic area. This can be determined by considering:

- Whether the resource is especially vulnerable to incremental effects;
- Whether the proposed action is one of several similar actions in the same geographic area;
- Whether other activities in the area have similar effects on the resource;
- Whether these effects have been historically significant for this resource; and
- Whether other analyses in the area have identified cumulative effects.

Additionally, the analysis should consider whether geographic and time boundaries large enough to include all potentially significant effects on the resources of concern have been identified. Geographic boundaries should be delineated and include natural ecological boundaries and the time period of the project's effects. The adequacy of the cumulative impact analysis depends upon how well the analysis considers impacts that are due to past, present, and reasonably foreseeable actions. This can be best evaluated by considering whether the environment has been degraded (to what extent); whether ongoing activities in the area are causing impacts; and the trend for activities and impacts in the area (USEPA 1999). The ROI for cumulative impacts analysis includes the installations and restricted airspace surrounding both Holloman AFB and Edwards AFB. Specific projects that have occurred, those currently taking place, and those projected for the future are identified in subsequent subsections.

As active military installations, Holloman AFB and Edwards AFB experience changes in mission and training requirements in response to defense policies, current threats, and tactical and technological advances. As a result, the bases require new construction, facility improvements, infrastructure upgrades, and maintenance and repairs on an ongoing basis. Although such known construction and upgrades are a part of the analysis contained in this EA, some future requirements cannot be predicted. As those requirements surface, future NEPA analysis will be conducted, as necessary.

5.1 Past and Present Activities At or Near Holloman AFB

5.1.1 Military Projects

Numerous changes have recently occurred or are being planned in around Holloman AFB. Other recent or ongoing actions at Holloman AFB proper are summarized below. Other military actions surrounding Holloman AFB that could contribute to the cumulative impacts are discussed in the subsequent paragraphs.

- Beddown of the F-22A and retirement of the F-117A. As part of the beddown of the F-22A, three existing ATCAAs (Beak A/B/C) were vertically modified, one existing ATCAA (Cowboy) was vertically modified and split into three ATCAAs (Cowboy A/B/C) and four new ATCAAs (Ancho A/B/C and Valmont) were created. Not all F-22A aircraft have arrived at Holloman AFB as of January 2009; consequently, overall aircraft operations have been temporarily reduced.
- Installation of new perimeter fencing as part of antiterrorism protection requirements.
- Repairs along 2 miles of 49er Avenue. The project resurfaced, widened and added paved shoulders to the roadway.
- The 49 MMG is undertaking a phased development of the 49 MMG compound (also known as the BEAR Base Area) over the next several years. Construction projects would alleviate existing shortfalls, improve operating conditions, and keep pace with anticipated mission demands in the future. The compound occupies the land between the proposed MPC and the former F-117A area. Short-range projects include constructing a K-Span training area and utility element, repairing the ramp and some roadways, constructing an access road to mobility area, enclosing a drainage ditch, and expanding Building 953. Future development would expand ramp, mobility, training, and storage areas within the compound and to the south and east of the existing area. Long-term redevelopment could expand the BEAR Base Area on the south side of the airfield.
- Construct a new golf course or expand the current course to 18 holes.
- The Military Family Housing project involves extensive redevelopment of family housing on Holloman AFB over the next several years. Most of this activity would occur in the general vicinity of the existing family housing areas in the southeast corner of the base. About 970 existing units are being demolished and 1,063 new units constructed. There would be a net increase of 93 family housing units on base.
- In the fall of 2004, saltcedar lining the ditch in the south clear zone was treated with the herbicide Arsenal. Removal of the stumps followed after two years, with the intent to create a body of open water where none previously existed.
- Holloman AFB may pursue a project to repair and replace a portion of one of its water supply pipelines located within the city of Alamogordo.

Cannon AFB completed an EIS in 2007 regarding the New Mexico Training Range Initiative (NMTRI), which includes modifying the configuration of existing airspace, creating new airspace, authorizing supersonic flight above 10,000 feet MSL in the airspace, or about 5,000 to 6,000 feet AGL, and expanding the use of defensive countermeasures (chaff and flares) into the new and modified airspace. The intent of the project is to provide more realistic training opportunities for the 27th Fighter Wing and the New Mexico Air National Guard in Cannon AFB-managed airspace. The Proposed Action would expand the size, operational altitudes, and usefulness of the Pecos MOAs and associated ATCAAs. The resulting airspace would allow pilots to train in the full range of missions and tactics they require to prepare for combat, including supersonic simulated weapons delivery and defensive maneuvers. The NMTRI airspace could potentially overlap with the airspace area that would be use by MQ-1/MQ-9 training missions.

Fort Bliss recently completed its Mission and Master Plan Supplemental EIS. The Proposed Action would change land use in the Main Cantonment Area to support units assigned to Fort Bliss under BRAC, and in the Fort Bliss Training Complex to support construction of livefire ranges and designation of off-road maneuver space needed to train soldiers to doctrinal

standards. The Proposed Action would include all changes described in the other alternatives providng almost 352,000 acres of off-road maneuver training area in the Tularosa Basin portion of McGregor Range about the existing capability. It would provide all the training benefits of the other alternatives including battalion-level movement-to-contact exercise and capability and a variety of terrain environments, and offer the most capacity and flexibility to accommodate future mission changes and training requirements. These changes would provide the capacity to support up to six Brigade Combat Teams. As a consequence of the expanded training missions, airspace over McGregor Range will also become more heavily utilized and, thus, less available for MQ-1/MQ-9 training operations.

DoD is currently in the planning stages to deploy the Joint Land Attack Cruise Missile Defense Elevated Netted System (JLENS). The primary location is Dugway Proving Ground, Utah, but some components will be located at WSMR as well. The specifics of the WSMR deployment are still under development; however, up to three aerostats, operational test component, training test components, and support staff could be deployed to WSMR.

The tethered aerostats contain radar systems that are used to provide over-the-horizon detection and tracking of low-flying cruise missiles and drones. The aerostats operate at altitudes of up to 15,000 feet MSL. The potential location of the JLENS would be in the southeastern portion of WSMR near the Oro Grande Range Camp.

The Air Force established an aeroacoustic targeting complex in FY08 near the Stallion Range in the northwestern portion of WSMR. This complex consists of a set of two 300-foot high and two 1,200-foot high towers, which are used to measure the acoustic footprint of various aircraft.

White Sands Missile Range recently (2006) completed an EA to support initial operations for the Future Combat System maneuver-to-test program. Test activities will occur over the next few years and require limited use of the southeast portion of WSMR for off-road track vehicles operations, as well as use of existing roads, trails and developed sites on WSMR. The test program would use soldiers from active training units in the test phases so that the dimension of soldier performance can be part of the feedback in system development and refinement. Some test events would schedule WSMR restricted airspace for aircraft overflights, unmanned aerial vehicles, acquiring targets, and use of countermeasures.

The Defense Threat Reduction Agency released the Final PEIS in 2007 to continue and expand its activities relative to the weapons effect test facilities and programs on WSMR. Most of the facilities and tests take place in the northern part of WSMR. Some tests involve the use of weapons delivered from aircraft, and require scheduled use of airspace. Some tests involve the use of high explosives, lasers, electromagnetic pulse devices, chemical, biological, and radiological simulants, and unmanned devices. conducts tests to evaluate the lethality of conventional and advanced weapons against various targets. These tests assist in the development and implementation of new weapon technologies to reduce the threat of weapons of mass destruction (WMD). Mock enemy targets, including deeply buried and concrete-reinforced structures are used to test weapon systems. Counterterrorism tests examine protection of people and property against a terrorist attack. Collateral effects testing against mock WMD facilities uses simulates to gather data to model the dispersion of chemical, biological and radiological materials. These tests help reduce the effects that an attack on a WMD facility could cause on nearby areas. These areas and activities would overlap with airspace areas required for MQ-1/MQ-9 training missions.

JTX Roving Sands is a joint-services exercise in New Mexico and Texas sponsored by the U.S. Army. It generally takes place for one month in the spring, in the years it takes place. This exercise has included Holloman AFB-managed airspace and aircraft in the past. The exercise also involves ground and airspace use at WSMR and Fort Bliss, New Mexico. A variety of aircraft, including helicopters, may use restricted and military airspace during such an exercise. The exercise has been less frequent in recent years and its future requirements and size are unknown. These areas and activities would overlap with areas identified for the MQ-1/MQ-9 training for the Proposed Action at Holloman AFB.

5.1.2 Other Federal, State, and Local Actions Surrounding Holloman AFB

Other past, current, and future federal actions in the area could also contribute to cumulative effects of the Proposed Action or alternatives. Federal agencies with jurisdiction within the ROI include the BLM, USFWS, FAA, Federal Highway Administration, and Federal Energy Regulatory Commission. Potential actions, within the area and occurring in the same time frame as the proposed MQ-1/MQ-9 beddown, were identified and considered in preparation of this Draft EA.

The BLM manages a sizeable portion of the land within the region under the restricted airspace, MOAs, and ATCAAs, particularly that associated with McGregor Range. The primary uses in this region are grazing and dispersed recreation, and limited oil and gas production under the Talon A/B/C MOAs and ATCAAs and the Beak C MOA/ATCAA. There are also several specially designated areas with special resource values. BLM revises its management plans periodically to keep pace with changing conditions and demands. Recently, The Las Cruces Field Office completed a Resource Management Plan amendment and EIS for McGregor Range at Fort Bliss, an EIS was completed for Federal Fluid Minerals leasing on over 2 million acres in Sierra and Otero Counties. Currently, the Las Cruces Field Office is also preparing a plan revision and EIS for the tri-county area, including Otero, Sierra, and Doña Ana Counties in New Mexico, the Draft EIS is scheduled to be released in 2009. Parts of these areas and activities would overlap with areas identified for MQ-1/MQ-9 training both under the Proposed Action at Holloman AFB.

The BLM Roswell Field Office published its *Resource Management Plan* in 1997 (BLM 1997). The BLM completed an EA for its *Fire and Fuels Management Plan Amendment*; the Decision Record was signed in September 2004.

Aplomado falcons were released in both Texas and New Mexico and could occur within the airspace to be used by MQ-1/MQ-9 training. Although this species is listed as endangered it is now treated as a Proposed species under the ESA (due to its special 10j status as a Nonessential Experimental Population). As indicated previously, the Proposed Action would not likely jeopardize this species, as no suitable habitat would be altered by the construction activities within the proposed beddown area, or from UAS operations.

5.1.3 Non-Federal Actions Near Holloman AFB

Non-federal actions include State of New Mexico, county, and private projects. General ongoing state activities include oil, gas, and grazing leases on state trust lands, land exchanges, road projects, and improvements to state parks and monuments.

The New Mexico State Land Office has signed an agreement for the development of Spaceport America on 15,000 acres of state trust lands near Upham, New Mexico, about 20 miles north of Las Cruces (New Mexico State Land Office 2006). Before construction and operations can begin, the FAA Office for Commercial Space Transportation must approve and issue a license

to the operator and facility. This process involves completion of an EIS and an in-depth safety review. The facility would be adjacent to WSMR restricted airspace. An economic study projects that commercial space operations could begin by 2010, with a potential market for 65 launches in 2010, increasing to 430 by 2020 (Futron 2005). The study also projects that construction may generate about 2,460 jobs in the near-term. Once operating, space transportation could generate as much as $400 million in economic activity and over 2,500 jobs in the local and regional economy. These activities would overlap with portions of the airspaces proposed for MQ-1/MQ-9 training.

A new water desalination plant is being constructed on Fort Bliss, east of El Paso International Airport. The facility will be part of the water supply system for the City of El Paso. Several million people in the region (including southern New Mexico, west Texas, and northern Mexico) obtain water from underground aquifers. The supply of high-quality water is finite, while brackish water is plentiful (Hill 2005). Two other plants are in development in the region. The Tularosa Basin National Desalination Research Facility is conducting initial operations in Alamogordo. An Alamogordo Municipal Desalination Plan is proposed to treat new water sources being developed for the city. Alamogordo currently gets most of its water from spring runoff from the Sacramento Mountains, Bonito Lake and a small pocket of groundwater south of Alamogordo, but some of this water exceeds allowable levels of dissolved solids (U.S. Water News 2001). The Alamogordo Municipal plant would process water from a well field proposed about 10 miles north of Tularosa.

5.2 Past and Present Activities At or Near Edwards AFB

According to the 95th Wing Base (2008), over 90 to 95 percent of the past, present, and reasonably foreseeable actions occurring in the ROI are associated with ongoing operations at Edwards AFB. Other major actions and projects considered and addressed here would represent only a very small percentage of the total number of actions.

5.2.1 Air Force and Other Federal Projects

Table 5-1 lists other projects and foreseeable actions that are scheduled to occur and identifies potential cumulative impacts.

The level of flight activity at AFFTC and Edwards AFB has remained fairly constant since 2000 (95th Wing Base 2008). The number of sorties associated with operations at Edwards AFB (including NASA-related flights) from 2000 through 2005 has been approximately 10,250 per year (95th Wing Base 2008). The number of sorties has varied from a 7.5 percent reduction from 2000 to 2001, a 2.7 percent increase from 2002 to 2003, and 9.0 percent decrease from 2003 to 2004 and 2004 to 2005. These aircraft regularly use the runways at Edwards AFB, the surrounding controlled airspace, and targets on the Precision Impact Range Area to test aircraft integration and system capabilities.

Table 5-1. Projects with Potential Cumulative Impacts

Project	Description
Edwards AFB Runway Replacement Project	The main runway is being replaced in three phases.
Testing and Evaluation of Directed Energy Systems	Testing laser and high power microwave systems against targets at Edwards AFB. Projected from 2006 to 2012.
West Mojave Plan	Covers 9.4 million acres including most of the California West Mojave Desert. Objective to conserve and protect desert tortoise, Mohave ground squirrel, and over 100 other species.
Livestock Grazing Authorization	Permit grazing by various types of livestock on BLM lands at various sites beneath the corridors.
Naval Air Station China Lake	Testing and training on the ranges at NAWS China Lake support DoD and NASA flight and ground operations.
Naval Air Station Lemoore Military Operations Area	New military operations area would extend from 5,000 to 35,000 feet AGL over parts of California.
Low-Level Testing and Evaluation at Edwards AFB	Flight tests from Edwards AFB and other DoD and NASA aircraft use 30 previously established routes for low-level flight training.
Wind Energy Project for Eleven Western States	BLM studied the impacts of wind energy development over the next 20 years. Wind turbines are known to create noise and visual impacts in the immediate area.
Hypersonic Corridors Flight Corridors	Air Force and NASA propose testing hypersonic vehicles over four corridors extending up to 825nautical miles from Edwards AFB.

Source: 95th Wing 2008

5.3 Cumulative Effects Analysis

Other military actions in the region overlap in space or time with the proposed action but these overlaps have historically been handled through intense, coordinated scheduling. This scheduling has not resulted in cumulative impacts. There is potential interaction with some on-going and recent projects, described above, to have the potential to either increase or offset possible environmental consequences. The following sections describe what these potential outcomes may be. Due to a lack of specific description of other major actions (past, present or future), these are assessed qualitatively.

5.3.1 Transportation and Utilities

5.3.1.1 Holloman AFB

Implementation of the Proposed Action at Holloman AFB would increase both on- and off-base traffic due to daily commutes of up to 600 permanent staff members and their dependants. Once the F-22 beddown is complete, additional traffic increases would occur, resulting in cumulative effects. Other projects identified above would not add to these effects as most are either improvements to on-base facilities or would occur at surrounding facilities and, thus, would not result in long-term traffic increases. Cumulative effects to transportation routes on base would be minimal to moderate, but would still be below historic levels. Off-base transportation routes would experience minor cumulative impacts and still be well below their current capacities. None of the other future projects identified above would add to the cumulative impacts of transportation on or near the base.

Current and proposed demands on utilities at Holloman AFB are well below design capacity and the addition of 600 permanent staff and 200 students would pose a negligible to minor cumulative impact on these resources. The increase in base population as a result of the MQ-1/MQ-9 FTU beddown would not reach historic levels.

5.3.1.2 Edwards AFB

Cumulative impacts on transportation and utilities at Edwards AFB would be similar to that described above for Holloman AFB. There are no other current proposals for additional beddown activities or other military realignments at Edwards AFB, so the proposed MQ-1/MQ-9 beddown would be the only expected increase in population and traffic. The extant transportation routes and utilities are below their design capacity and the increase in utility demands and commuter traffic would result in minor cumulative impacts at Edwards AFB. None of the other future projects identified above would add to the cumulative impacts of transportation on or near the base.

5.3.2 Cultural Resources

5.3.2.1 Holloman AFB

Any federal project in the region that includes ground disturbing activities has the potential to adversely affect cultural resources and is subject to NEPA compliance and Section 106 consultation. Such projects include construction, oil and gas development, off-road tracked vehicle training, pipelines or other facilities; highway work; or any other ground-disturbing undertaking that affects public land. The proposed taxiway, which would be constructed as part of the MQ-1/MQ-9 beddown, could impact undiscovered cultural resources; however, appropriate coordination would be conducted to avoid or mitigate any adverse impacts should any buried resources be discovered during construction. Likewise, consultation with the New Mexico SHPO would be conducted to ensure any proposed modifications to Building 301 would not adversely affect the historic integrity of this structure. Consequently, no significant cumulative impact on historic properties is expected as a result of the proposed beddown at Holloman AFB.

5.3.2.2 Edwards AFB

Cumulative impacts on historic properties at Edwards AFB, as a result of the proposed MQ-1/MQ-9 beddown, would be similar to that described at Holloman AFB. Although there is new construction that would occur, all the areas proposed for the construction have been surveyed and cleared for cultural resource. Demolition or renovation of the hangar at the North Base area, however, would require consultation with the California SHPO to avoid or mitigate impacts to this structure. Consequently, no cumulative impacts on cultural resources at Edwards AFB are anticipated.

5.3.3 Socioeconomics and Environmental Justice

5.3.3.1 Holloman AFB

The balance of ongoing and anticipated military actions is likely to have a long-term, strong positive effect on regional economy, even though there may be local differences in effects. Since the Nation and the region has experienced a recent (2008) downturn in employment and personal income, the proposed MQ-1/MQ-9 beddown and other military projects that are on-going (e.g., F-22A beddown) would result in beneficial cumulative impacts. Depending upon the timing of construction projects, temporary immigration of laborers may exceed capacity of local and regional accommodations; however, renovation and construction associated with the MQ-1/MQ-9 beddown is expected to occur over the next 5 years; thus, the cumulative impact of the construction activities should be minimal.

The Proposed Action would not cause any cumulative disproportionate impacts on minorities, low-income populations, or children in the vicinity of the base or under the airspace. The incremental effects of the proposed MQ-1/MQ-9 beddown, in combination with potential impacts associated with the past and reasonably foreseeable future actions described in this section,

would not be expected to have any significant cumulative effects on minority or low-income populations nor on children.

5.3.3.2 Edwards AFB

Cumulative impacts on socioeconomic conditions at and surrounding Edwards AFB would be similar to that described for Holloman AFB.

5.3.4 Biological Resources

5.3.4.1 Holloman AFB

The biological resources at Holloman AFB are managed in accordance with Holloman's INRMP (U.S. Air Force 2000). Although the airfield contains some native vegetation communities, and thus, provides wildlife habitat, the loss of 16 acres to construct a parallel taxiway would not result in significant cumulative impacts, or be in conflict with the management goals of the INRMP. Cumulative impacts to native flora and fauna have and do occur on surrounding public and private lands due to grazing, off-road traffic, introduction of non-native species, and development. Development and management of the LHWC and BWWSA, in addition to removal and control of the invasive saltcedar, would provide beneficial cumulative effects on wildlife populations at Holloman AFB. The continued and increased use of the established air-to-ground firing ranges could potentially kill or injure individual specimens. However, wildlife populations would not experience adverse cumulative impacts due to these activities. No cumulative impacts on wildlife populations would be expected as a result of noise generated during the proposed MQ-1/MQ-9 training missions, as the noise levels would be attenuated by the altitude of these aircraft. No additional sonic booms would be generated by either aircraft. No other major ground disturbing activities have been identified on WSMR or Holloman AFB that could result in cumulative impacts to wildlife and their habitats. The expansion of the training mission at Fort Bliss and McGregor Range could have moderate to major impacts on that installation's wildlife populations and vegetation communities. The proposed MQ-1/MQ-9 beddown would not contribute to those cumulative impacts, however.

5.3.4.2 Edwards AFB

The proposed beddown and flight operations would not create a significant cumulative impact on natural resources at Edwards AFB. The flight operations would not result in any changes to grazing patterns as authorized by the BLM; therefore cumulative impacts from the Livestock Grazing Authorization would not be expected to result in any additional cumulative impacts on natural resources. The cumulative effects of the windblown soils and contaminants on plants in the target areas would be considered less than significant, since they are generally devoid of plants, and the areas outside the immediate target areas are sparsely populated with plants. The 95th Wing Base (2008) reported no records of direct impacts to plants or sensitive species resulting from the use of these targets and test sites. Similar to operations at Holloman AFB, individual wildlife specimens could be injured or killed by bombing activities, but no cumulative effects to wildlife populations would be expected. Mitigation measures have been indentified by Edwards AFB and USFWS to minimize potential cumulative impacts on Mohave ground squirrel, desert tortoise, and other sensitive or protected species, including compensation for the loss of any specimens injured or killed by weapons systems. No other major ground disturbing activities have been identified on Edwards AFB that could result in cumulative impacts to wildlife and their habitats.

Mitigation measures that minimize potential noise impacts from flight operations are identified in the *R-2508 Complex User's Handbook* (Edwards AFB 2007); however, as noted above for Holloman AFB, there are no separate or cumulative impacts on wildlife relative to noise generated by the MQ-1/MQ-9 aircraft expected.

5.3.5 Earth and Water Resources

5.3.5.1 Holloman AFB

The effects to earth (soil, topography) and water resources associated with the MQ-1/MQ-9 beddown do not coincide with areas where other ground-based activities occur or may increase in the region (such as at Fort Bliss training areas). The F-22A construction at Holloman would increase development on the base over the next few years, but these actions, like the MQ-1/MQ-9 construction activities would occur in previously disturbed and developed areas; thus, no significant cumulative impacts to earth and water resources are anticipated. The increase in 600 permanent staff and 200 students would result in minor to moderate cumulative demands on water supplies; however, these demands would be below historic levels due to recent inactivation of other squadrons at Holloman AFB. No other major ground disturbing activities have been identified on WSMR or Holloman AFB that could result in cumulative impacts to soils and water resources.

5.3.5.2 Edwards AFB

The cumulative impacts on earth and water resources at Edwards AFB would be similar to that described for Holloman AFB. No separate or cumulative significant impacts on these resources have been identified.

5.3.6 Air Quality

5.3.6.1 Holloman AFB

The potential cumulative air quality impacts would result from operations occurring below 3,000 feet AGL and ground disturbing activities. Emissions created by flight activity, commuter traffic, and construction activities, as addressed in Section 4.8.2, would be well below *de minimis* threshold levels. Otero County is in attainment for all priority pollutants; thus, no adverse cumulative impacts are anticipated as a result of the proposed MQ-1/MQ-9 beddown or other on-going or proposed actions in the region. As increased training occurs at McGregor Range, cumulative adverse impacts to the region's airshed could occur, especially in regards to PM-10 and PM-2.5. These cumulative impacts could be moderate to major, depending on the extent and type of the training, the existing soil conditions at the time of the training, and the season in which the training occurs.

According to the 95th Wing Base (2008), the U.S. military aircraft used approximately 0.5 percent of the aviation fuel consumed in 2000. Historically, the aviation sector has been estimated to emit about 2.6 percent of the Nation's greenhouse gas emissions; thus, the U.S. military aircraft contributes a very small portion of these gases (U.S. General Accounting Office [GAO] 2000). Currently, no universal standard has been accepted to determine the significance of cumulative impacts of GHG emissions. In the absence of any controlling standard, the emissions associated with UAS operations and the FTU program would not be expected to significantly contribute to climate change on a cumulative basis. The proposed MQ-1/MQ-9 sorties would not significantly add to the greenhouse gas emissions occurring nationwide or globally.

5.3.6.2 Edwards AFB

Air emissions from aircraft operating out of Edwards AFB have occurred for over 12,500 sorties without creating any significant air quality impacts (95th Wing Base 2008). The cumulative totals based on the historical trends would result in a similar number of sorties; therefore, the cumulative effects would be expected to be less than significant. If emissions from other projects occurring in the same geographic region were to exceed the *de minimis* threshold values, then the effects on air quality would be significant. Consequently, air quality permits would be reviewed to ensure emission levels would remain below threshold limits and

addressed in separate environmental analyses. Cumulative air emissions considered from other similar actions in the R-2508 Complex would include activities at NAWS China Lake and Fort Irwin. Because activities for these other areas are in different air districts, have their own attainment status, and emissions below 3,000 feet AGL are geographically separated by mountain ranges that minimize the mixing of emissions from these areas, the cumulative effects for air quality would not impact the Edwards AFB area. Other air quality impacts would result from permitted open burn/open detonation events that occur on the ranges. Due to the nature of the detonation process, the chemicals in these emissions are consumed as part of the process. The air emissions from vehicles and support equipment were calculated and would be expected to create minor increase to current levels and would be below *de minimis* threshold levels.

Impacts on greenhouse gas emissions from UAS operations would be similar to that described under the Holloman AFB alternative. The proposed MQ-1/MQ-9 sorties would not significantly add to the greenhouse gas emissions occurring nationwide or globally.

5.3.7 Airspace and Range Management, Noise, and Safety

5.3.7.1 Holloman AFB

Airspace management and air safety are vulnerable to incremental effects and, if the cumulative actions were to overload the capacity of the airspace or the controller's ability to manage flight activity, then cumulative impacts would be considered significant. Several actions have taken place at Holloman AFB over the last decade that have increased or decreased operations and changed aircraft type, number of operations, and support staff. As a result, airspace demand, safety issues and noise levels at the airfield and surrounding areas have also varied. The base has historically experienced noise levels much higher than would be expected under the Proposed Action. The addition of 2,880 annual sorties by MQ-1/MQ-9 aircraft would represent 7 percent increase over the current flight operations and, thus, would not result in a significant cumulative impact to ambient noise levels.

Cumulative effects to regional airspace would occur where the airspace is used and controlled by FAA and DoD. As completion of the F-22A beddown comes to fruition, the level of use of restricted airspace will increase, requiring more coordination between airspace managers and users to satisfy their respective missions. In addition, changes to Cannon AFB mission and the use of the Melrose Range in west central New Mexico would add to the cumulative effects on airspace. Some impacts to civil aviation may occur as part of large force exercises associated with F-22A training. However, MQ-1/MQ-9 training flights would be scheduled to ensure that the airspace is safely allocated and no conflicts with such large scale training occurs.

Most other actions at Holloman AFB, WSMR, and McGregor Range may produce localized noise increases, primarily from ground activities (such as weapons firing ranges, field training exercises or MILCON projects), so cumulative noise impacts would be localized and primarily on federally-owned land. None of the cumulative impacts identified for airspace, ranges, noise or safety would be significant, but will likely require more coordination between Albuquerque Air Route Traffic Control Center, the FAA Central Service Region and military airspace managers.

5.3.7.2 Edwards AFB

Similar to the airspace surrounding Holloman AFB, the number of flight activities in the SUA and R-2508 Complex is strictly controlled, thus minimizing potential cumulative impacts. Historically, the number and type of flight operations in the R-2508 Complex have not created airspace management and air safety issues because the flight planning and safety process has included risk analysis and the implementation of safety measures for each activity. The Edwards AFB runway replacement project and flight operations in a new Naval Air Station Lemoore MOA all

have the potential for cumulative impacts when combined with the proposed MQ-1/MQ-9 training flights. Flight activities at Naval Air Station Lemoore MOA would be expected to segregate flight activities, thus minimizing potential conflicts and cumulative effects.

Considering up to 2,880 additional sorties as an increment to existing operations is probably the worst case assumption. The Proposed Action as addressed in this EA would add more flight operations to actions already analyzed, but would still be well below the number of flight operations conducted in the 1980s and 1990s. In general, since the operations (airspeeds, altitudes, aircraft type) of these training flights would be similar to those already evaluated, it would be expected these flights would have no measurable cumulative impact on most of the existing environment (95th Wing Base 2008).

Noise impacts associated with the proposed MQ-1/MQ-9 beddown, combined with noise generated by on-going and proposed test flights, bombing ranges and MILCON projects at Edwards AFB would be similar to that described above for Holloman AFB. No significant cumulative impact on noise sensitive receptors or wildlife would be expected.

5.4 Other Environmental Considerations

5.4.1 Relationship Between Short-Term Uses and Long-Term Productivity

CEQ regulations (Section 1502.16) specify that environmental analysis must address "…the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity." Special attention should be given to impacts that narrow the range of beneficial uses of the environment in the long-term or pose a long-term risk to human health or safety. This section evaluates the short-term benefits of the proposed alternatives compared to the long-term productivity derived from not pursuing the proposed alternatives.

A short-term use of the environment is generally defined as a direct consequence of a project in its immediate vicinity. Short-term effects could include localized disruptions and higher noise levels. Under the Proposed Action, short-term uses of the environment would result in noise from construction activities. Noise generated by construction activities would be temporary and sporadic and would not be expected to result in adverse effects on noise sensitive receptors, wildlife or livestock.

The long-term impacts of the MQ-1/MQ-9 beddown would primarily involve additional use of airspace. These changes in airspace use would not impact the long-term productivity of the land and natural resources.

5.4.2 Irreversible and Irretrievable Commitment of Resources

NEPA CEQ regulations require environmental analyses to identify "...any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented" (40 CFR Section 1502.16). Primary irreversible effects result from permanent use of a nonrenewable resource (e.g., minerals or energy). Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., disturbance of a cultural site) or consumption of renewable resources that are not permanently lost (e.g., old growth forests). Secondary impacts could result from environmental accidents, such as explosive fires. Natural resources include minerals, energy, land, water, forestry and biota. Nonrenewable resources are those resources that cannot be replenished by natural means, including oil, natural gas and iron ore. Renewable natural

resources are those resources that can be replenished by natural means, including water, lumber and soil.

For the Proposed Action at either Holloman AFB or Edwards AFB, most impacts are short-term and temporary, or in the case of airspace long-term, but negligible. No irretrievable commitment of natural or cultural resources are expected as a result of the construction or renovation of facilities associated with the proposed beddown. Military training necessarily involves consumption of nonrenewable resources, such as gasoline for vehicles/aircraft and jet fuel for aircraft.

Secondary impacts to natural resources could occur in the unlikely event of an accidental fire, such as caused by an aircraft mishap. However, while any fire can affect agricultural resources, wildlife, and habitat, the increased risk of fire hazard due to operations under the Proposed Action is very low.

SECTION 6.0
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SECTION 7.0
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SECTION 8.0
LIST OF ACRONYMS

8.0 List of Acronyms

AAF	Army Airfield
AAQS	Ambient Air Quality Standards
ACC	Air Combat Command
ACHP	Advisory Council on Historic Preservation
ADP	Area Development Plan
AFB	Air Force Base
AFFF	Aviation Fire Fighting Foam
AFFTC	Air Force Flight Test Center
AFI	Air Force Instruction
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection and Health
AFRL	Air Force Research Laboratory
AGL	above ground level
AGM	air to ground missile
AHAS	Avian Hazard Advisory System
Air Force	United States Air Force
AMU	Aircraft Maintenance Unit
AOR	Area of Operations
APE	Area of Potential Effect
AQB	Air Quality Bureau
ARMS	Archaeological Records Management
ARTCC	Air Route Traffic Control Center
ATCAA	Air Traffic Control Assigned Airspace
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	All-Terrain Vehicle
AVEK	Antelope Valley East Kern Water District
BAM	Bird Avoidance Model
BASH	Bird Aircraft Strike Hazard
bgs	below ground surface
BHPO	Base Historic Preservation Officer
BIA	Bureau of Indian Affairs
BISON-M	Biota Information System of New Mexico
BLM	United States Bureau of Land Management
BMP	Best Management Practice
BNSF	Burlington Northern Santa Fe Railroad
BOS	Base Operations Support
BWWSA	Boles Wells Water System Annex
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAF	Combat Air Forces
CALEPA	California Environmental Protection Agency
CAP	Combat Air Patrol
CARB	California Air Resources Board
CENTCOM	Central Command
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CO	Carbon Monoxide
COA	Certificate of Waiver or Authorization

CWA	Clean Water Act
CWRB	California Water Resources Board
CS/CSX	Communications Squadron
dBA	A-Weighted Decibels
DCGS	Distributed Common Ground Systems
DFRC	NASA Dryden Flight Research Center
DHHS	Department of Health and Human Services
DMS	Defense Messaging System
DNL	Day-Night Average Sound Level
DoD	Department of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EO	Executive Order
EOD	Explosive Ordinance and Disposal
ERP	Environmental Restoration Program
ESA	Endangered Species Act
°F	Fahrenheit
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FL	Flight Level
FONSI	Finding of No Significant Impact
FTU-2	Second Formal Training Unit
FY	Fiscal Year
GBU-12	Guided Bomb Unit-12
GCS	Ground Control Stations
GDT	Ground Data Terminal
GIS	Geographic Information System
HATR	Hazardous Air Traffic Reports
HSR	Human Systems Research
ICRMP	Integrated Cultural Resources Management Plan
IICEP	Interagency/Intergovernmental Coordination for Environmental Planning
IRP	Installation Restoration Program
INRMP	Integrated Natural Resource Management Plan
JDAM	Joint Direct Attack Munitions
KV	kilovolt
LHWC	Lake Holloman Wetlands Complex
LOLA	Live Ordinance Loading Area
LOS	Line of Sight
LRE	Launch and Recovery Elements
LRS	Logistics Readiness Squadron
LS	Lump Sum
MCE	Mission Control Element
MG	million gallons
MGD	million gallons per day
MILCON	Military Construction
MOA	Military Operations Area
MPH	miles per hour
MRI	Midwest Research Institute
MSA	Munitions Storage Area
MSL	mean sea level
MTR	Military Training Route

NAAQS	National Ambient Air Quality Standards
NAS	National Airspace System
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIPRNET	Non-Secure Internet Protocol Router Network
NMAAQS	New Mexico Ambient Air Quality Standards
NMCRIS	New Mexico Cultural Resource Information System
NMED	New Mexico Environment Department
NMDGF	New Mexico Department of Game and Fish
NMNHS	New Mexico Natural Heritage System
NO_x	Nitrogen Oxides
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
O&M	Operations and Maintenance
O_3	Ozone
OSHA	Occupational Safety and Health Administration
Pb	Lead
PCPI	Per Capita Personal Income
PDM	Program Decision Memorandum
PG&E	Pacific Gas and Electric
PGM	Precision Guided Munitions
PM-10	Particulate Matter
POL	Petroleum, Oil and Lubricants
POV	Privately Owned Vehicle
PPDL	Point to Point Data Link
PPE	Personal Protection Equipment
ppm	parts per million
PVC	Polyvinyl Chloride
PWRR	Process, Workflow, Requirements and Resource
ROI	Region of Influence
RS	Reconnaissance Squadrons
SCE	Southern California Electric
SF	Square Feet
SHPO	State Historic Preservation Officer
SIPRNET	Secure Internet Protocol Router Network
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedure
SPCCP	Spill Prevention, Control and Countermeasures Plan
SUA	Special Use Airspace
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compounds
SWPPP	Stormwater Pollution Prevention Plan
SY	Square Yards
TDY	Temporary Duty
UAS	Unmanned Aircraft System
UHMM	UXO Hazards and Munitions Management

UMD	Unit Manning Document
USACASB	United States Army Combined Arms Support Battalion
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USC	United States Code
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
UXO	Unexploded Ordnance
VCP	Vitrified Clay Pipe
VOC	Volatile Organic Compounds
WCA	Wildlife Conservation Act
WSMR	White Sands Missile Range

APPENDIX A
AREA OF DEVELOPMENT PLAN

Holloman Air Force Base

Area Development Plan for the MQ-1 Predator and MQ-9 Reaper

April 2009

Table of Contents

Holloman Air Force Base

Area Development Plan for the MQ-1 Predator and MQ-9 Reaper

Mission

To develop and maintain operational capability to conduct strategic warfare as an Air Combat Command (ACC) base and to provide unsurpassed combat support forces to meet any worldwide contingency, academic ground and flying training for its people and selected foreign crews, and quality support for all base personnel associate units and the local community.

1.0 Introduction

1.1 Plan Purpose

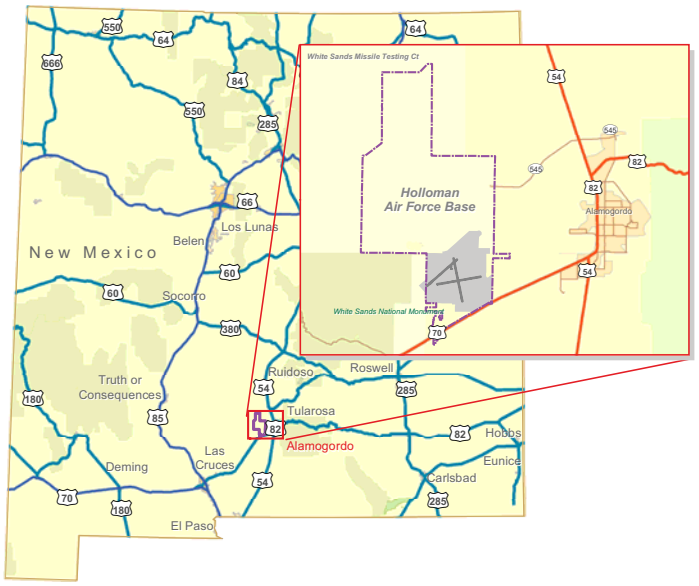
This Area Development Plan (ADP) provides a coordinated development plan for the MQ-1 Predator and MQ-9 Reaper Unmanned Aerial System (UAS) mission at Holloman Air Force Base (AFB), located six miles west of Alamogordo, New Mexico. This ADP addresses the context, goals, long range planning, and ultimately the implementation and construction of the UAS operations and support services. This ADP will look at three different options but will ultimately reflect the preferred option also known as Option A.

As part of the Air Force comprehensive planning process, this ADP provides the commander and installation decision makers with the information necessary for the successful implementation of the preferred MQ-1 and MQ-9 beddown plan. This plan considers man-made and natural constraints and existing Holloman AFB planning documents to ensure the preferred option fits within the context and character of the base. This ADP provides an important link between the overall Base Comprehensive Planning documents (such as the General Plan Update, Anti-terrorism and Force Protection Plan, Landscape Enhancement Plan, Air Installation Compatible Use Zones-AICUZ, and the 49th Fighter Wing brief) and development/construction of each individual construction project.

This ADP presents the various options for the MQ-1 and MQ-9 beddown and ultimately details the preferred option. The planning process is a multi-disciplined effort involving command, operations, support, and administrative functions that represent the various missions of the 49th Fighter Wing (49FW) personnel. This plan was developed through a public planning process that involves all potential stakeholder organizations, base planning staff, and command level guidance.

1.2 Plan Goals

The following planning goals were developed and utilized in the creation of the preferred option for the MQ-1 and MQ-9 beddown. These goals are also compatible with the most recent Base General Plan Update:



Goals

- Protect personnel and resources through the wise use of ATFP design parameters
- Ensure that facility design and infrastructure improvements will adequately support the MQ-1/ MQ-9 UAS mission for years to come
- Minimize the use of water, fuel and electricity through "green" design
- Maintain the natural and man-made environment of the base
- Create a development plan that will provide future base leaders and decision makers with the tools, flexibility, and guidance necessary to maintain the MQ-1/MQ-9 UAS mission at Holloman AFB

1.3 Installation Background

Holloman Air Force Base, originally known as the Alamogordo Army Air Field, was established in 1942 and served as the training grounds for over 20 different groups through WWII. On January 13, 1948 the installation was renamed Holloman Air Force Base, in honor of the late Col. George V. Holloman, a pioneer in guided missile research.

In July 1968 the 49th Tactical Fighter Wing arrived at Holloman AFB. The 49th's F-4 Phantom IIs introduced a new era of fighter aircraft training and operations, which continued for the next three decades and into the 21st Century. In 1977 the 49th transitioned to the F-15 Eagle, the Air Force's top air-to-air weapon. In 1992, Holloman Air Force Base again garnered national attention when the Air Force's most technological fighter, the F-117A Nighthawk made its new home at Holloman.

Holloman AFB is also home to the German Air Force Tactical Training Center (GAF TTC), activated in 1996, where German Air Force pilots and weapon system officers (WSO) learn to operate the Tornado, an air-to-ground and air defense fighter. The German Air Force has been training its aircrews in the United States since 1958. This training took place on various bases before moving to Holloman Air Force Base in 1992.

As of July 2007 there are 600 German military personnel and 21 Tornado aircraft assigned to Holloman AFB, NM. These numbers may increase up to 900 personnel and 42 A/C, depending on the actual training needs.

There are numerous reasons the German Air Force trains here. The area offers great flying weather and has suitable air space. Other reasons are the proximity of Holloman AFB to the German Air Force Air Defense Center (GAF ADC) at Ft. Bliss, TX and the centralizing of German aircrew training for the TORNADO at a single location.

Today, Holloman Air Force Base continues to serve at the forefront of military operations, with its F-22 Raptor aircraft.

The Holloman Air Force Base current mission is: ***"To develop and maintain operational capability to conduct strategic warfare as an Air Combat Command (ACC) base and to provide unsurpassed combat support forces to meet any worldwide contingency, academic ground and flying training for its people and selected foreign crews, and quality support for all base personnel associate units and the local community."***

Currently, the base covers 59,639 acres and supports a population of about 21,000 Active Duty, Guard, Reserve, retirees, DoD civilians and their family members. Currently, the base flies the T-38 Talon, F-22A Raptor, QF-4 drone, and the German Air Force Tornado aircraft.

Holloman is home to the world's longest (50,788 feet, or almost 10 miles) and fastest (approaching 10,000 feet per second, or Mach 9) test track. The 846th Test Squadron set the world land speed record for a railed vehicle with a recent run of 6,453 mph, or Mach 8.5.

Personnel from Holloman AFB have participated in numerous operations and conflicts such as: Operation Desert Shield/Desert Storm, Operation Allied Force, Operation Southern Watch, Operation Northern Watch, Operations Enduring Freedom, Operation Iraqi Freedom, and many more. Holloman personnel also provided presidential support for President Clinton's visit to China in June 1998 and the 49th Medical Group deployment of an air transportable hospital to Guyana to support deployed U.S. military personnel and Guyana citizens in July 1997. Holloman personnel also assist White Sands Missile Range personnel in supporting the White Sands Space Harbor as an alternate runway for NASA space shuttle missions. The space shuttle Columbia landed at WSSH March 30, 1982 and 1,400 Holloman personnel supported that landing.

1.4 Weapon System Overview

The MQ-1 Predator is a medium-altitude, long-endurance remotely piloted aircraft system. It is a Joint Forces Air Component Commander-owned theater asset for reconnaissance, surveillance and target acquisition in support of the Joint force Commander. Predator is a reconnaissance system available in the U.S. inventory that can provide near real time video imagery day or night in all-weather conditions via satellite worldwide without exposing pilots to combat fire. As the first successful UAS program to be fielded in decades, Predator provides tactical and strategic intelligence to operational commanders worldwide.

MQ-1 Predator

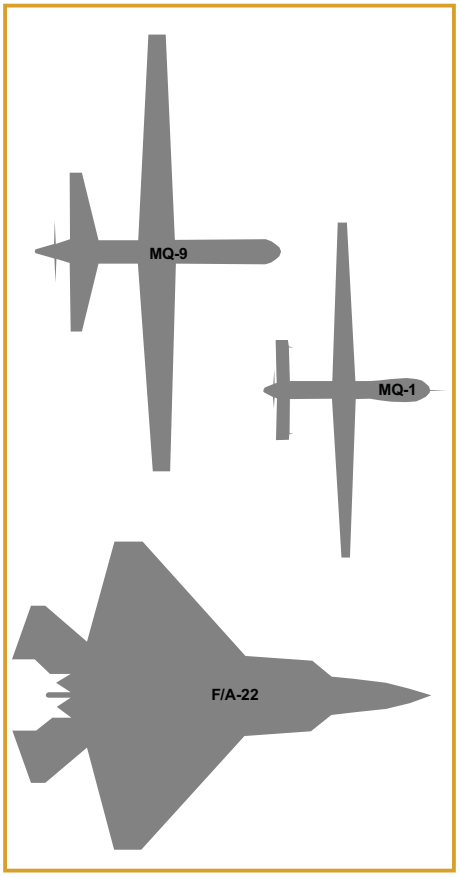
Primary Function: Armed reconnaissance, airborne surveillance and target acquisition
Power Plant: Rotax 914F four cylinder engine
Thrust: 115 horsepower
Wingspan: 48.7 feet (14.8 meters)
Length: 27 feet (8.22 meters)
Height: 6.9 feet (2.1 meters)
Weight: 1,130 pounds (512 kilograms) empty
Maximum takeoff weight: 2,250 pounds (1,020 kilograms)
Fuel Capacity: 665 pounds (100 gallons)
Payload: 450 pounds (204 kilograms)
Speed: Cruise speed around 84 mph (70 knots), up to 135 mph
Range: up to 400 nautical miles (454 miles)
Ceiling: up to 25,000 feet (7,620 meters)
Armament: two laser-guided AGM-114 Hellfire missiles
Crew (remote): Two (pilot and sensor operator)

The Predator system was designed in response to a Department of Defense (DoD) requirement to provide persistent intelligence, surveillance, and reconnaissance information to the war fighter. It was the first successful advance concept technology demonstration, which was an acquisition process designed to reduce costs and development time by relying on commercial off-the-shelf and government off-the-shelf technologies to the maximum extent possible.

In April 1996, the Secretary of Defense selected the USAF as the operating service for the RQ-1A Predator system. Operating responsibility is at the 11th, 15th, and 17th reconnaissance Squadrons, Indian Springs Air Force Auxiliary Field, Nevada.

Since 1995, Predator has been deployed to Southwest Asia and has recently completed its fifth combat area deployment to the Balkans in providing reconnaissance support to NATO forces in Kosovo. Predators have logged over 22,000 flight hours with over 8,200 of these hours in combat area deployments. Based upon the success of the program, the U.S. Department of Defense transitioned the Predator program to production in August 1997, marking it as the first Advanced Concept Technology Demonstration (ACTD) program to be designated an Acquisition Category II (ACTII) Program. Predator has demonstrated the ability to remain airborne for over 40 hours.

The MQ-9 Reaper is also a medium-to-high altitude, long endurance UAS. The MQ-9's primary mission is as a persistent hunter-killer against emerging targets to achieve Joint Force commander objectives. The MQ-9's alternate mission is to act as an intelligence, surveillance and reconnaissance asset, employing sensors to provide real-time data to



MQ-9 Reaper

Primary Function: Unmanned hunter/killer weapon system
Power Plant: Honeywell TPE331-10GD turboprop engine
Thrust: 900 shaft horsepower maximum
Wingspan: 66 feet (20.1 meters)
Length: 36 feet (11 meters)
Height: 12.5 feet (3.8 meters)
Weight: 4,900 pounds (2,223 kilograms) empty
Maximum takeoff weight: 10,500 pounds (4,760 kilograms)
Fuel Capacity: 4,000 pounds (602 gallons)
Payload: 3,750 pounds (1,701 kilograms)
Speed: cruise speed around 230 miles per hour, (200 knots)
Range: 3,682 miles (3,200 nautical miles)
Ceiling: up to 50,000 feet (15,240 meters)
Armament: Combination of AGM-114 Hellfire missiles, GBU-12 Paveway II and GBU-38 Joint Direct Attack Munitions.
Crew (remote): Two (pilot and sensor operator)

commanders and intelligence specialists at all levels. The Air Force proposed the MQ-9 system in response to the DoD request for Global War on Terrorism initiatives. It is larger and more powerful than the MQ-1 Predator and is designed to go after time-sensitive targets with persistence and precision, and destroy or disable those targets. The MQ-9 is currently operated by the 42nd Attack Squadron based at Creech Air Force Base, NV. Each MQ-9 aircraft can be disassembled into main components and loaded into a container for air deployment worldwide.

The basic crew for the both the MQ-1 and MQ-9 is one pilot and two sensor operators. Each aircraft can be disassembled into six main components and loaded into a container nicknamed "the coffin." This enables all system components and support equipment to be rapidly deployed worldwide. The largest component is the ground control system (GCS), available as both a mobile unit, designed to be rolled into a C-130, or installed in permanent operations centers. The air transportable Predator Primary Satellite Link (PPSL) consists of a 6.25-meter Ku=Band satellite system mounted on a trailer. It provides communications between the ground station and the aircraft when it is beyond line-of-sight and is a link into secondary intelligence dissemination networks. The system needs 5,000 feet by 125 feet (1,524 meters by 38 meters) of hard surface runway with clear line-of-sight to each end from the GCS to the air vehicles. The aircraft are equipped with a color nose camera (generally used by the aerial vehicle operator for flight control), a day variable aperture TV camera, a variable aperture infrared camera (*for low light night), and a synthetic aperture radar (SAR) for looking through smoke, clouds, or haze. The cameras produce full motion video and the SAR still frame radar images. The three sensors are carried on the same airframe but cannot be operated simultaneously.

The MQ-1 Predator and MQ-9 Reaper are systems, not just aircraft. A fully operational system consists

GCS

PPSL

of four aircraft (with sensors), a GCS, a PPSL, and 55 personnel for continuous 24-hour operations.

2.0 Existing Conditions

2.1 Natural Conditions

Geography

Holloman Air Force Base is located approximately 10 miles west of Alamogordo, New Mexico, 90 miles north of El Paso, Texas, and 70 miles east of Las Cruces, New Mexico.

Holloman AFB is located in New Mexico's Tularosa Basin between the Sacramento and San Andres mountain ranges. It is bounded to the north-west by White Sands Missile Range (WSMR), which extends roughly 100 miles north-south and 40 miles east-west, and the White Sands National Monument of the southwest corner of the base. Holloman AFB covers 52,073 acres and an additional 7,566 acres of noncontiguous lands in the Boles Wells Water System Annex (BWWSA) and Bonito Lake.

Tularosa Peak is the highest point within the Main Base, reaching an elevation of 4,330 feet; the lowest point being the extreme southern tip of Stinky Playa at 4,015 feet. The elevation difference between the highest and lowest points is 315 feet.

Climate

The climate of Holloman AFB is influenced by its location between mountain ranges and a winter minimum/summer maximum precipitation regime. The base averages 8.3 inches of rain annually with an average humidity of 48 percent. The average temperature is 61 degrees Fahrenheit (F) with seasonal mean temperatures of 42 F in January and 80 F in July. Snow falls occasionally in the winter months but is usually very light. The area averages more than 300 days of sunshine per year. The summer rainy season is the Monsoon Season and typically accounts for over half the areas average rainfall.

Hydrology

There are no permanent or perennial water bodies within the area identified for the MQ-1/MQ-9 complex. The flat topography, relatively permeable soils, and infrequent rain result in arid soil conditions. There are no existing floodplains or floodways within the Option A MQ-1/MQ-9 beddown area.

Soils

Soils at Holloman Air Force Base are well drained and unstable. All soils have a high gypsum and salt content and are composed of the Holloman-Gypsum land-Yesum soil complex and covers over two thirds of the base.

2.2 Utilities

Water Distribution/Fire Protection System

The proposed MQ-1/MQ-9 site is located in an area that has already been developed and is utilizing existing buildings and utility infrastructure. The proposed usage and occupancy for the existing buildings is anticipated to generate the water demand the buildings historically experienced, with the exception of fire protection for three (3) buildings.

Anticipated water uses for the proposed facility include potable water for consumption and personnel use, facility washdown and maintenance needs.

Pumping and storage may be required to provide adequate fire protection pressure and supply. One feasible option is to install a well in the vicinity of the 3 buildings and storage at each building in order to provide non-potable water for adequate fire protection.

An updated hydraulic water model of the base is currently being created. It is recommended that this updated model is utilized to determine the detailed

effect the beddown will incur on the base's water distribution system. Specific recommendations for improvements to the existing water distribution system to support the MQ-1/MQ-9 beddown cannot be provided without the detailed hydraulic modeling. This modeling will help identify improvements required to support the beddown as well as those needed to improve current deficiencies in the existing water distribution system.

Based on current practice, it is expected that the bulk of fire protection needs for the MQ-1/MQ-9 will be provided by a high expansion foam system.

Wastewater Collection and Treatment

The proposed MQ-1/MQ-9 beddown site is currently served by the existing gravity sewer system. Assuming the usage and occupancy remains similar to the past use these buildings experienced, no additional sewer demands will occur, and, therefore, the existing sewer collection system will not need to be improved. Anticipated wastewater flows generated from the facility appear to be well within the treatment limits of the plants permitted capacity.

Currently, Holloman AFB is replacing the Vitrified Clay Pipe (VCP), which has been historically used for sewer mains, to the current industry standard of Polyvinyl Chloride (PVC) pipe as occasions arise. It is recommended that building cleanouts and sewer mains in the vicinity of the proposed beddown site are inspected at the time of final design. Any sewer lines that may be deteriorated, or otherwise may pose problems in the lifespan of the MQ-1/MQ-9 beddown, should be considered for rehabilitation during initial improvements so as not to interrupt operations and minimize costs and inconvenience.

Storm Drainage System

Based on discussions with Holloman Air Force Base personnel, many areas within the base are subject to extensive ponding of rainfall runoff during various storm events. During the site visit to the base, few catch basins used to intercept runoff were located. The majority of runoff looked to be directed to inadequately sized retention basins located in open space areas. The proposed area for the MQ-1/MQ-9 beddown area is subject to some of this runoff ponding. It is recommended that detailed drainage calculations occurs at time of final engineering of the beddown site and adheres to the U.S. Environmental Protection Agency (EPA) and General National Pollutant Discharge Elimination System (NPDES) requirements.

Electrical Distribution Systems

The electrical supply to Holloman AFB is delivered by El Paso Electric Company. Distributions lines currently serve the existing buildings proposed to be utilized for the proposed MQ-1/MQ-9 beddown area. Additional electrical demands may be generated by the proposed beddown usage. Preliminary design of facility needs will need to be identified to confirm the adequacy of the existing system.

Gas Distribution System

The existing buildings are currently connected to the existing gas system and as long as the usages of the buildings remain similar, the proposed MQ-1/MQ-9 beddown site will not require any improvements to the existing gas system. Natural gas supply does not appear to be a limiting factor to support the proposed beddown complex.

Assuming the usage and occupancy remains similar to the past use these buildings experienced, no additional gas demands will occur, and, therefore, the existing gas distribution system will not need to be improved.

Liquid Fuel Systems

Building 315 is an existing fuel storage site for aviation gas (AVGAS) and JP-8. This site currently stores fuel for the T-38 trainer aircraft, but is available for use by the MQ-1/MQ-9. Fuel will be transported to the UAVs via trucks and not require any additional pipelines or infrastructure.

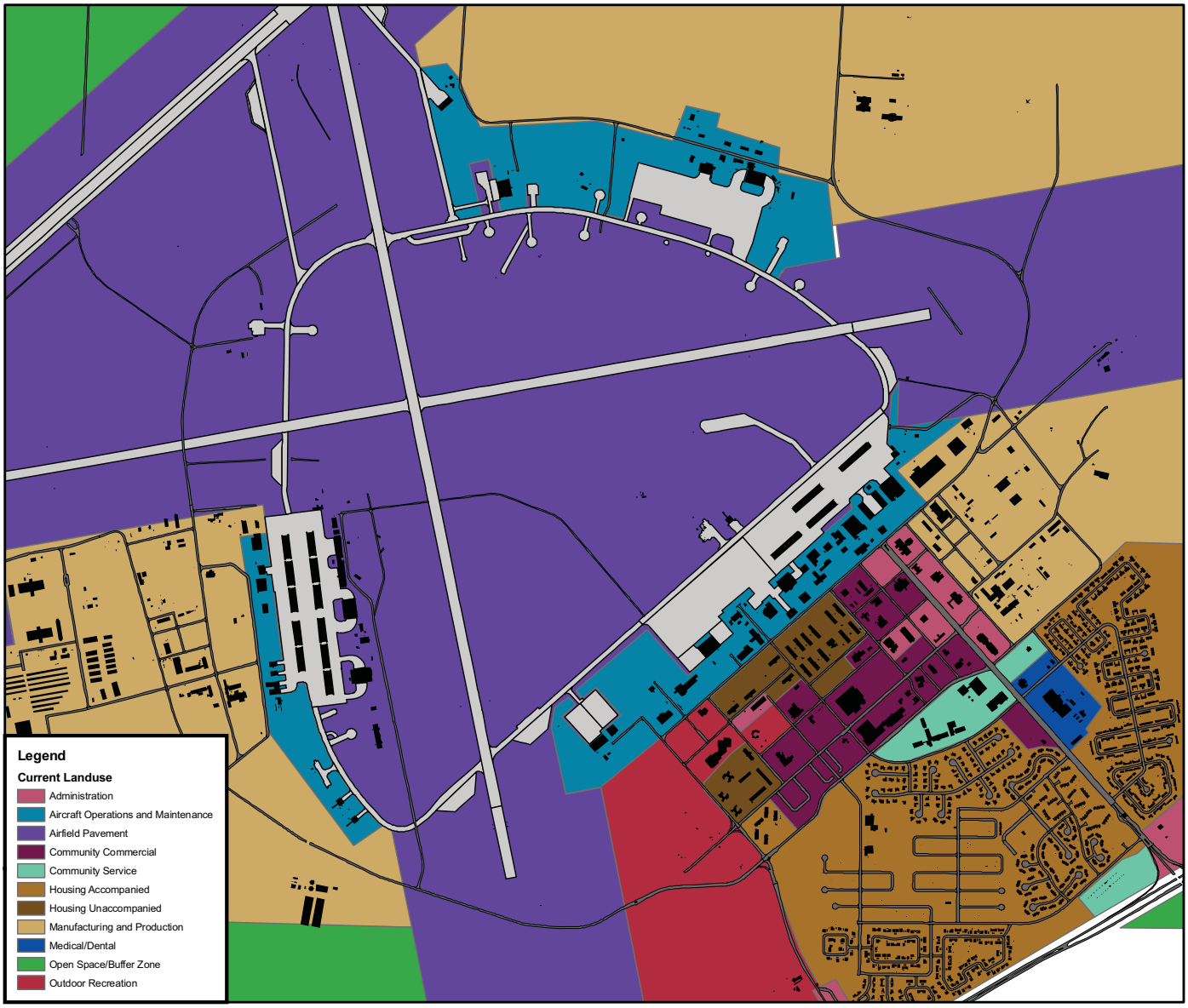


Figure 1.1 Current Land Use Map

Communications System

The existing communications infrastructure consists of telephone, unclassified network (non-secure internet protocol router network [NIPRNET], classified network (secure internet protocol router network [SIPRNET] and defense messaging system (DMS). These systems consist of underground conduits with manhole access. The existing buildings are currently served by the communications system. Once the communication demand is established for the beddown site, the existing communications system can be analyzed to determine if additional infrastructure is required.

All facilities would receive communications and information service through the 49 CS as defined in host-tenant support agreements. Telephone, network and special circuit requirements must be identified through the submission of a PWRR request to the 49 CS/SCX. The customer should submit requirements for all known communications needs as soon as possible. This would allow the communication squadron enough time to develop the technical solutions and actual costs for requirements. Base personnel would increase with this beddown action. The 49 CSISCX must coordinate with the wing's manpower office to determine if sufficient justification exists within the communications squadron to gain a BOS adjustment to their UMD.

2.3 Current Land Use

Holloman Air Force Base is a large installation comprising 59,639 acres. Much of the installation, however, is undeveloped and is used as a test range for carrying out operational exercises. The main base is defined by three runways and accompanying taxiways that form a triangular pattern. This triangular pattern has over time led to three areas of development: the Main Base, the West Area, and the North Area. Each of these areas contains administrative, operational, and industrial facilities. The Main Base, which is the largest of the three areas, also serves as the principal location for housing, medical, community, and recreational facilities. The land use patterns at Holloman AFB have evolved over time in a manner that is consistent with operations, support, and missions. Figure 1.1 shows current land use at Holloman AFB.

3.0 Site Analysis

3.1 Alternative Site Discussion

Originally, three beddown sites on Holloman AFB were considered. They were developed as alternatives from the original site survey conducted at Holloman AFB in 2002. That particular site survey was based on the beddown of combat-coded units, rather than training

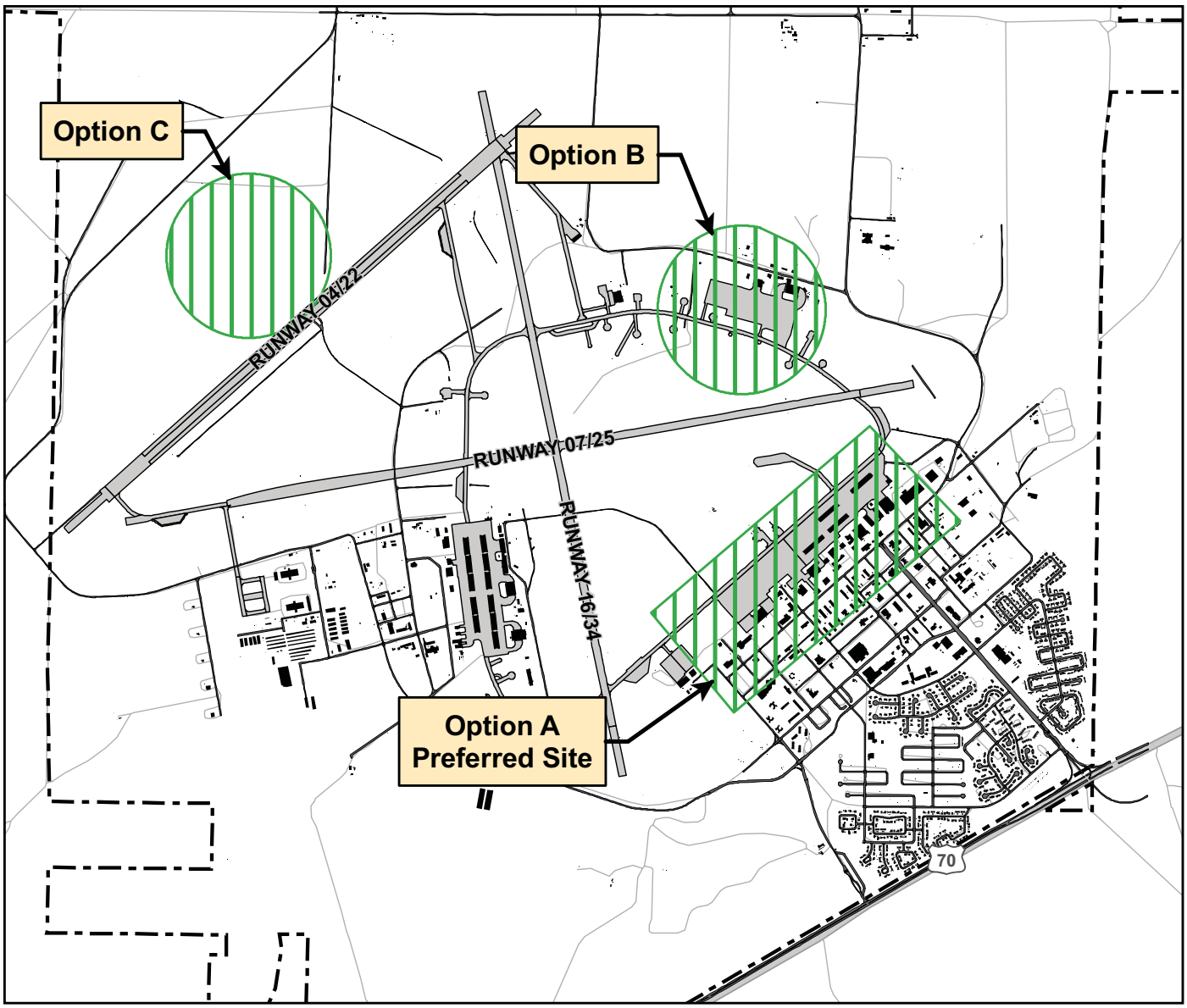
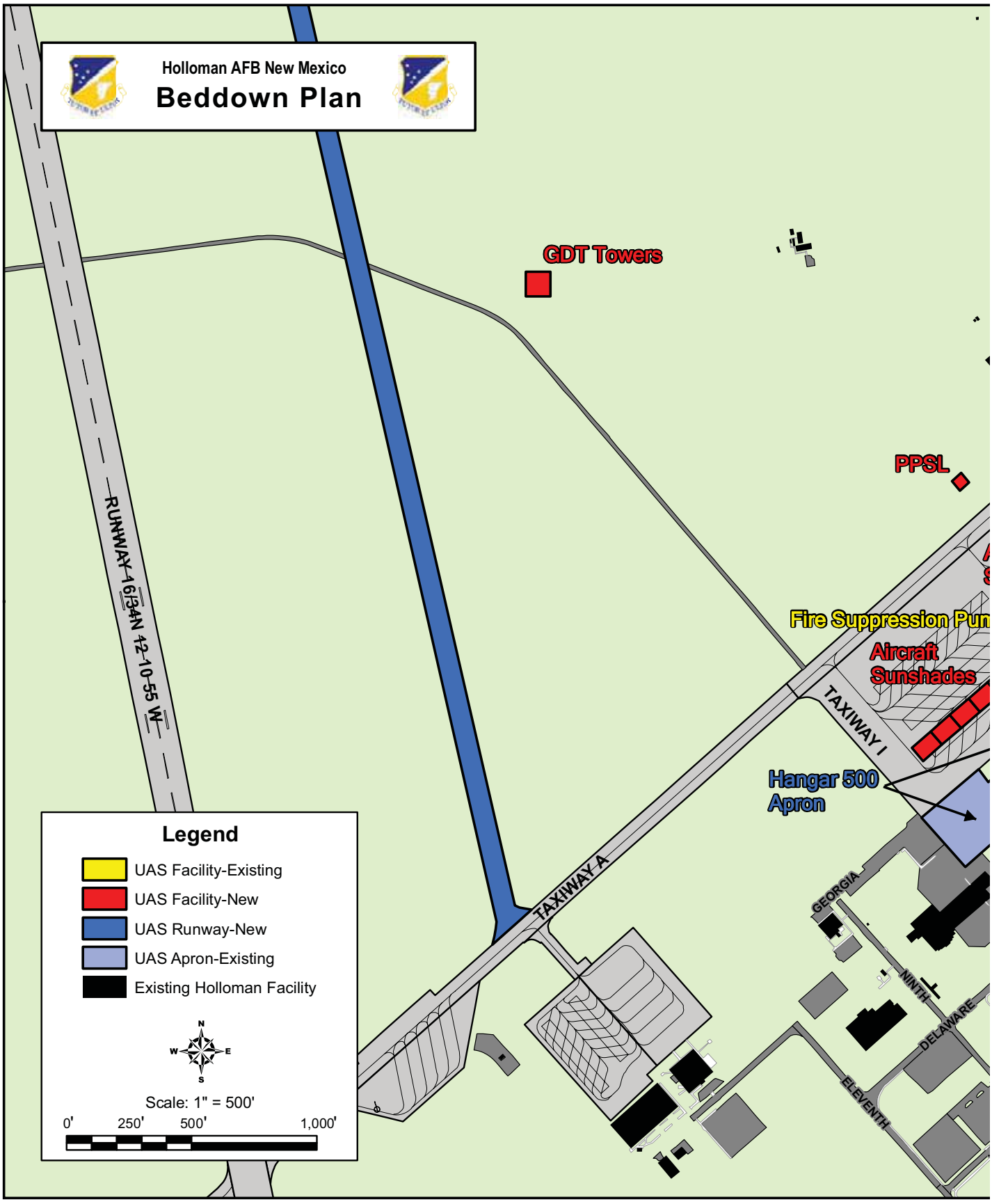


Figure 1.2 ADP Alternatives


Holloman AFB New Mexico
Beddown Plan
GDT Towers
PPSL
Fire Suppression Pum
Aircraft Sunshades
TAXIWAY I
Hangar 500 Apron
TAXIWAY A
RUNWAY 16/34N 12-10-55 W
GEORGIA
NINTH
DELAWARE
ELEVENTH
Legend
UAS Facility-Existing
UAS Facility-New
UAS Runway-New
UAS Apron-Existing
Existing Holloman Facility
N
W
E
S
Scale: 1" = 500'
0'
250'
500'
1,000'

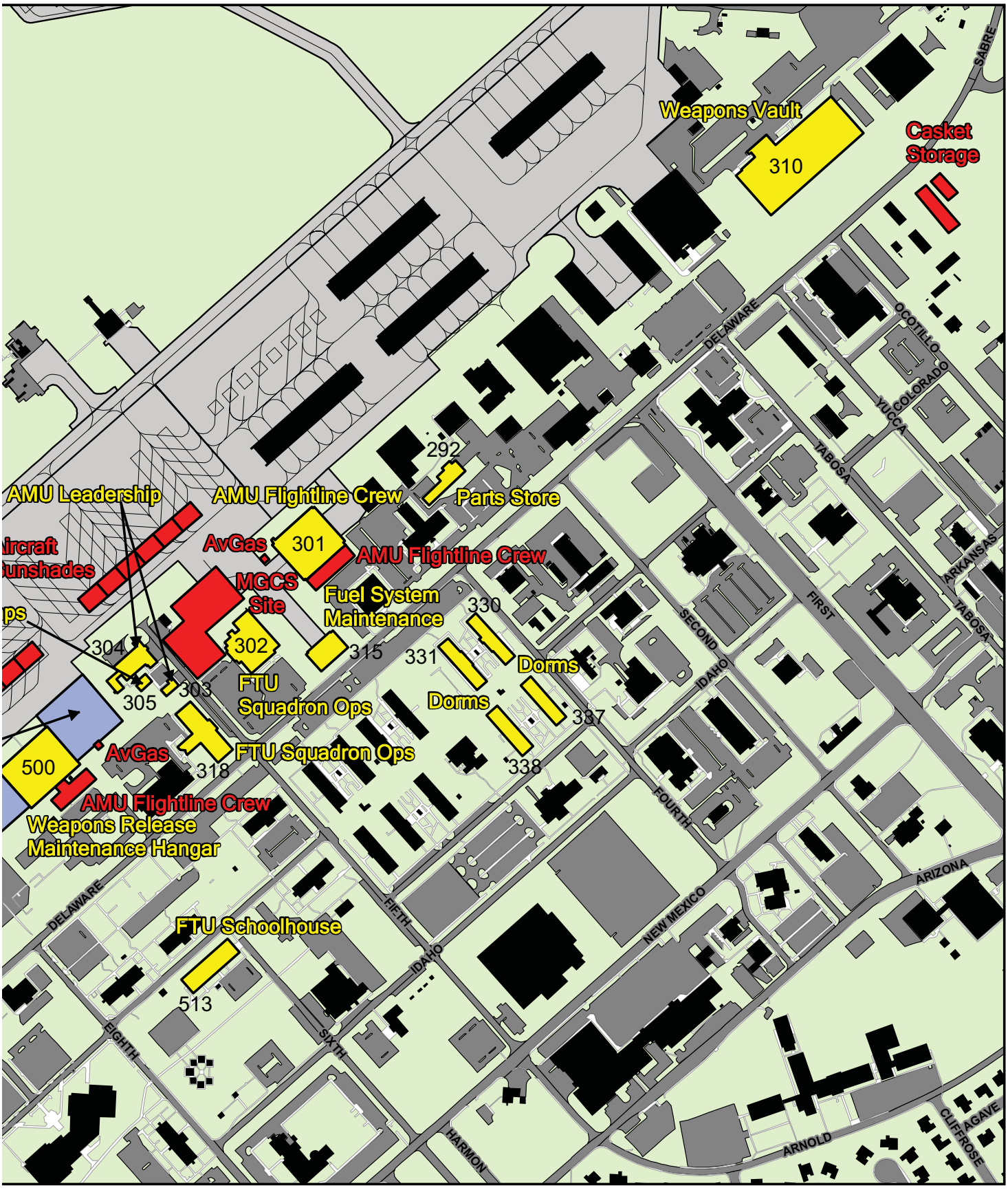

Weapons Vault
310
Casket Storage
SABRE
DELAWARE
OCOTILLO
COLORADO
YUCCA
TABOSA
ARKANSAS
FIRST
SECOND
IDAHO
FOURTH
ARIZONA
NEW MEXICO
FIFTH
SIXTH
EIGHTH
HARMON
ARNOLD
AGAVE
CLIFFROSE
292
AMU Leadership
AMU Flightline Crew
Parts Store
AvGas
301
AMU Flightline Crew
MGCS Site
Fuel System Maintenance
330
304
302
315
331
Dorms
303
305
FTU Squadron Ops
Dorms
387
500
AvGas
318
FTU Squadron Ops
338
AMU Flightline Crew
Weapons Release Maintenance Hangar
FTU Schoolhouse
513

Table 1.1 MILCON Requirements		
Function/Activity	**Required Space Initial Startup**	**Required Space Final Bed-down**
Parking Apron	30,000 SF	60,000 SF
Squardon Operations Facility	16,000 SF	48,000 SF
FTU Schoolhouse	20,000 SF	50,000 SF
(classroooms and simulators)	11,000 SF	11,000 SF
MCE Facility	12,000 SF	24,000 SF
Aircraft Maintenance Unit	30,000 Sf	70,000 SF
Munitions PGM Shop	2,250 SF	unknown
Munitions Storage	3,120 SF	unknown
Aircraft Parts Store	10,000 SF	10,000 SF
Weapons Load Trainer	1 Bay	1 bay (use maintenance bay)
Casket Storage	8,000 SF	16,000
Bulk Fuel Storage	(2) 16,000 gal tanks for AvGas	(2) 16,000 gal tanks for AvGas
Lodging	60 rooms	200 rooms
AME Storage and Build-up	Not required	Not required
Battery Shop	Not required	Not required
Armament Shop	24,000 SF for all backshop	24,000 SF for all backup
Engine Shop	24,000 SF for all backshop	24,000 SF for all backup
AGE Maintenance Shop	24,000 SF for all backshop	24,000 SF for all backup
Wheel and Tire Shop	24,000 SF for all backshop	24,000 SF for all backup
NDI Shop	24,000 SF for all backshop	24,000 SF for all backup
Structures Shop	24,000 SF for all backshop	24,000 SF for all backup
Composites Shop	24,000 SF for all backshop	24,000 SF for all backup
Avionics Shop	24,000 SF for all backshop	24,000 SF for all backup
E&E	24,000 SF for all backshop	24,000 SF for all backup

units. However, the earlier visit provided a baseline for further development as it relates to the current planning effort.

The options for this effort range from a total new construction strategy to a strategy that requires the relocation of long-standing units to other parts of the installation, as well as a strategy centered on leveraging existing facilities to the maximum extent possible.

The three options considered from the 2002 site survey are described as follows:

Option A (Preferred Site)

Centered on the Main Ramp, this option leverages existing facilities to support the beddown. Existing and unoccupied facilities available for use include, Bldg 318 (former 20FS), Bldg 500 (maintenance-hangar), and Bldg 513 (former FTD). Specifically, Bldg 513 is available now for all current MQ-l/MQ-9 FTU operations out of Creech AFB. As such, initial "flag standup" for the new FTU is supportable at any time. Other facilities which can be made available for a FTU Wing beddown include Bldg 301 (maintenance hangar) and Bldg 302 (former F-117 weapons school and current F-22A transition office). The facilities team recommends Option A as the preferred option.

Option B

The Test Ramp (also locally known as the North ramp) hosts the 46" Test Group, the RQ-4 mission, and an Army Air contingent. In order to use this location for the FTU, existing units would need to be relocated and a high MILCON investment would be required. The only facility that could be converted for the new mission is Bldg 1080, a maintenance hangar. All other facilities would need to be acquired through new construction. The ACC Site Survey Team concluded that Option B would pose an enormous challenge in a successful and timely MQ-l/MQ-9 FTU move.

Option C

Located in an undeveloped area northwest and adjacent to Runway 04/22, this option would result in new construction for required facilities and infrastructure. No existing facilities exist in the immediate area which could be leveraged to support the FTU mission. The ACC Site Survey Team concluded that Option C would pose an enormous challenge in a successful and timely MQ-l/MQ-9 FTU move.

3.2 Weapon System Facility Requirements

The MQ-1/MQ-9 mission would bring a new FTU squadron, in addition to the MQ-1 and MQ-9 squadrons being relocated from Creech AFB, approximately 750 to 800 personnel including 600 permanent party

personnel and 200 students. The force structure would consist of 28 MQ-1s/MQ-9s from Creech AFB and 10 MQ-1s/MQ-9s from the new squadron. There would be 12 Distributed Common Ground Systems (DCGS), four MCEs, two Launch and Recovery Elements (LRE) and four Primary Predator Satellite Links (PPSL). At any given time there would be three squadrons of personnel flying and one squadron in the classroom training. It is planned to have approximately 2,880 sorties per year based on three flying squadrons, of which approximately 540 would be conducted at night. Day training schedule would be from 0700 to 2200 hours, and night training from 2200 to 2400 hours.

A good portion of Holloman AFB's excess ramp space, Squad Ops facilities, maintenance hangars, and back shops, in existing configurations on the main ramp, can initially support the MQ-1/MQ-9 beddown. However, many of the existing facilities would require repair and conversion projects to bring them up to standards for long-term viability.

Main Ramp: The UAS mission would introduce a "schoolhouse" environment to the west end of the Main Ramp. A highly transient population of student pilots and sensor operators would be present on a continuous basis. The population would change-out once every quarter with a one-to-two week overlap on each end. As such, added demand for temporary quarters, base exchange, commissary, and other community-related functions would need to be met. POV traffic would increase in this area of the main base due to permanent staff assigned to the FTU. POV traffic due to the student population is deemed highly variable.

Munitions Storage Area: The FTU mission would introduce the Hellfire weapons system to the MSA. The MSA capacity related to both maintenance activities and storage is at a maximum due to the ongoing F-22A beddown. If the FTU Wing concept is also considered,

Table 1.2 Facility Plan

Function Description	Remarks
Flightline Pavement	Use Main Ramp
Live Ordnance Load Area	Construct new LOLA on taxiway Echo
Maintenance Hangar (New FTU)	Use Bldg 500
Maintenance Hangar (3 FTU Squadrons)	Use Bldg 301
FTU Squadron Operations (New FTU)	For initial capability, use Bldg 513 and a portion of Bldg 302; when project is complete, transition from Bldg 513 into Bldg 318
FTU Squadron Operations (Creech UAS)	If there are 2 FTU squadrons, use Bldg 318; a third FTU squadron can occupy all of Bldg 302 after F-22A transition is complete
Aircraft Maintenance Unit (AMU) (New FTU)	Initially locate leadership team in Bldg 303 and operate Flightline crews out of Bldg 301 until completion of Bldg 500 new construction (10,000 sf)
Aircraft Maintenance Unit (3 FTU Squadrons)	If two AMUs, locate both leadership teams in Bldg 303 and flightline crews of the 2nd AMU in Bldg 301. If three AMUs, locate third leadership team in Bldg 302; locate flightline crew of AMU #3 in Bldg 302. New construction for Bldg 301 can also be considered for crew #3
Fuel System Maintenance	Use Bldg 315
Precision Guided Munitions (PGM) Facility	Construct 2 maintenance bay and admin
Munitions Storage	Construct 26' x 120' Hayman igloo (possibly two 60' sections)
Aircraft Parts Store (New FTU)	Use existing contract support or shared Bldg 292 (T-38 Parts store)
Aircraft Parts Store (3 FTU Squadrons)	If T-38 mission relocates, use Bldg 292. If no relocation, add space to B292
Weapons release Shop	Use each respective maintenance bay (Bldg 500 for 1 and Bldg 302 for 2)
Casket Storage	Construct 50' x 80' covered storage pad in Logistics Readiness Squadron (LRS) yard. Requirement may grow dependent on quantity of MQ-9 caskets on hand
Bulk Fuel Storage	Construct two 8,000 gallon tanks adjacent to Hangars 301 and 500 (for AvGas) for MQ-1 and use existing JP-8 capacity for MQ-9
Various back shops	Construct 5,000 square feet addition on Bldg 500. Building 301 may require new additional space

small-diameter bomb, JDAM, and additional GBU-series weapons systems, including the GBU-12 and GBU-38 laser guided bombs, would also need to be supported. The inventory of weapons trailers and other support equipment would increase as well.

Ramp Space: Approximately 75,000 SM of aircraft parking space and taxi lane capacity is available for use. The new portion of the FTU beddown requires 30,000 SM for a 16 PAA MQ-I unit. An additional 30,000 SM of ramp space would be needed for FTU Wing development. There is a requirement for sunshades/ weather shelters for the UAS airframes.

Existing Buildings: Existing facilities could be converted for FTU purposes. Bldg 513 could be used for initial capability under the new FTU stand-up (FY09lQ2), and then can be converted into the FTU schoolhouse if/when the FTU Wing is executed. Bldg 318, after conversion and repair work is complete, would support all FTU squadron operations. Bldg 302 would be available to complete the FTU Wing beddown after the F-22A

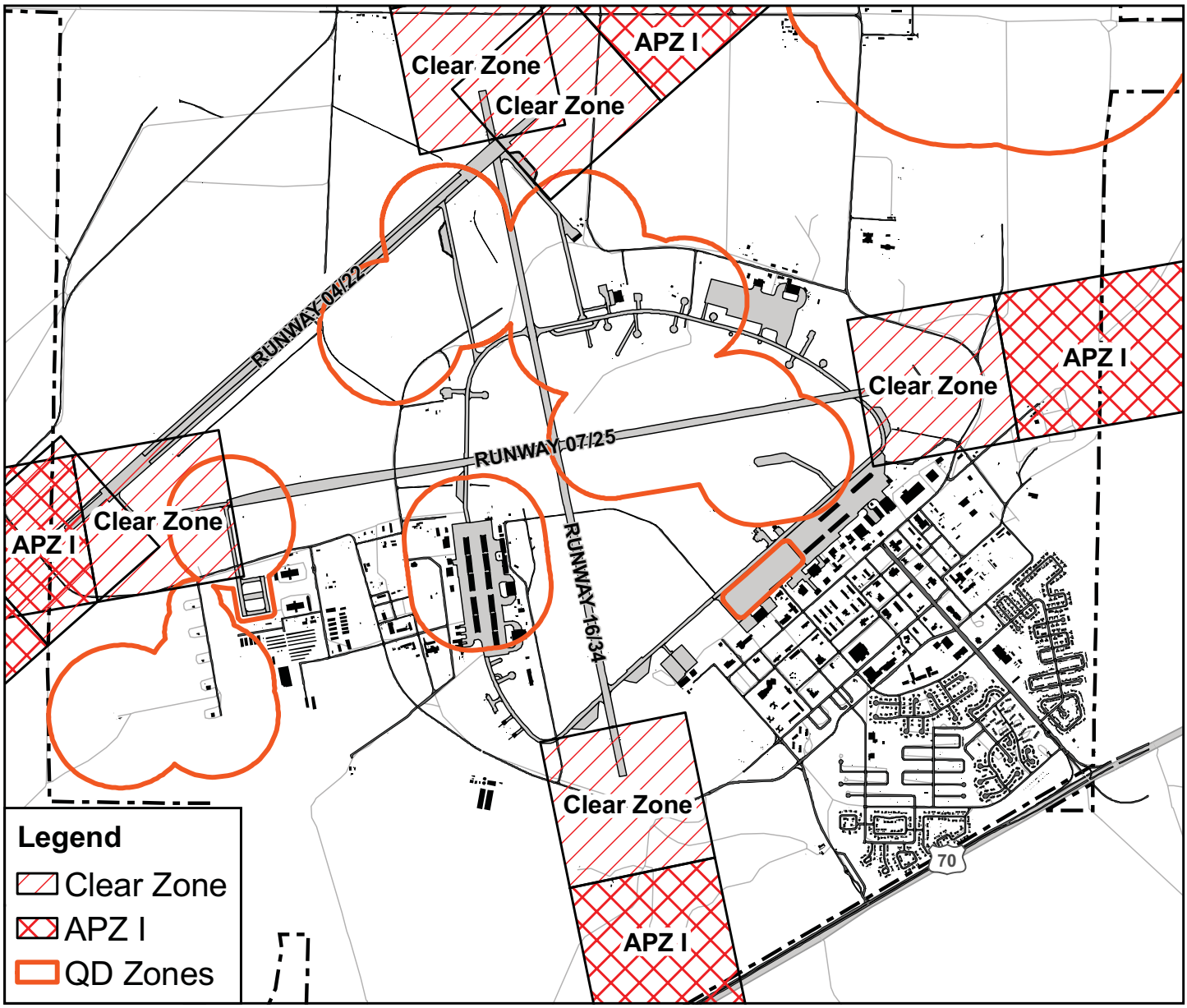


Figure 1.3 Airfield Constraints

Building 513


Building 301

transition is complete on the West Ramp. Bldg 500, after alterations and repairs are complete, would also be able to support all of the FTU beddown. Bldg 301 would be available to complete the FTU Wing beddown. It currently supports TDY units. Bay #5 in Bldg 1222 (Inspection Shop) contains an inoperative paint booth originally slated for trailer corrosion control activities. The booth was never certified for use. A project was validated to remove the paint booth, along with associated air handling equipment, and repair the bay for weapons inspection activities. The facility contains no substantial dividing walls; therefore, the project is required in order for non-compatible concurrent operations to take place.

4.0 Constraints

4.1 Airfield Constraints

All military airfields are required to maintain the proper setbacks from the main taxiway and runways located on the base per DOD and FAA regulations. Airfield lateral clearances and transitional slopes are imaginary surfaces that protect airfield operations and by extension, the integrity of airfield pavements. These areas and Clear Zones (CZ's) have a high potential for accidents and are accurately described as Accident Potential Zones (APZ I and APZ II) and must be compatible with airfield operations and kept free of obstructions or habitation.

The clear zone is the area closest to the runway end and, consequently, the most hazardous. The clear zone covers an area 3,000 by 3,000 feet, starting at the end of the runway and extends outward 3,000 feet. Construction in clear zones is generally prohibited, although there are waivers that allow certain exceptions.

Installations with munitions or other explosive storage, handling and maintenance facilities are required to establish safety clearance zones around these facilities. The size of these zones depends on several factors including the category and weight of the explosives contained in the facility and the construction of the facility. Separation distances are calculated using established QD criteria found in AFMAN 91-201.

The impact of violating Explosives QD Clear Zones includes the possibility of exposing people and materials to hazards, which will necessitate controls to eliminate the exposure. Exposure or infringement on Explosives QD Clear Zones is a violation of the explosives quantity distance sighting of the potential explosion site. Waivers or exemptions are load pads and hazardous cargo.

Explosive Quantity-Distance (QD) Clear Zones are the defined areas surrounding a facility or location containing explosive materials. The size of the area is determined by the required distance and separation between inhabited building and the explosives. The zones are delineated on installation maps with a QD arc. The inhabited building distance is established through an approved explosives QD site plan.

The Option A MQ-1/MQ-9 beddown area is located in the vicinity of the ESQD arcs associated with the adjacent parking apron and runway. For the most part, these ESQD arcs are not expected to have a major influence on the beddown area. However, caution will be used when designing the facilities so as to avoid these ESQD arcs.

4.2 Airspace

FAA policy restricts UAS operations to restricted airspace. Although Holloman AFB does not manage any restricted airspace, it has access to a multitude of Restricted Areas within White Sands Missile Range (WSMR) and McGregor airspace to allow UAS training.

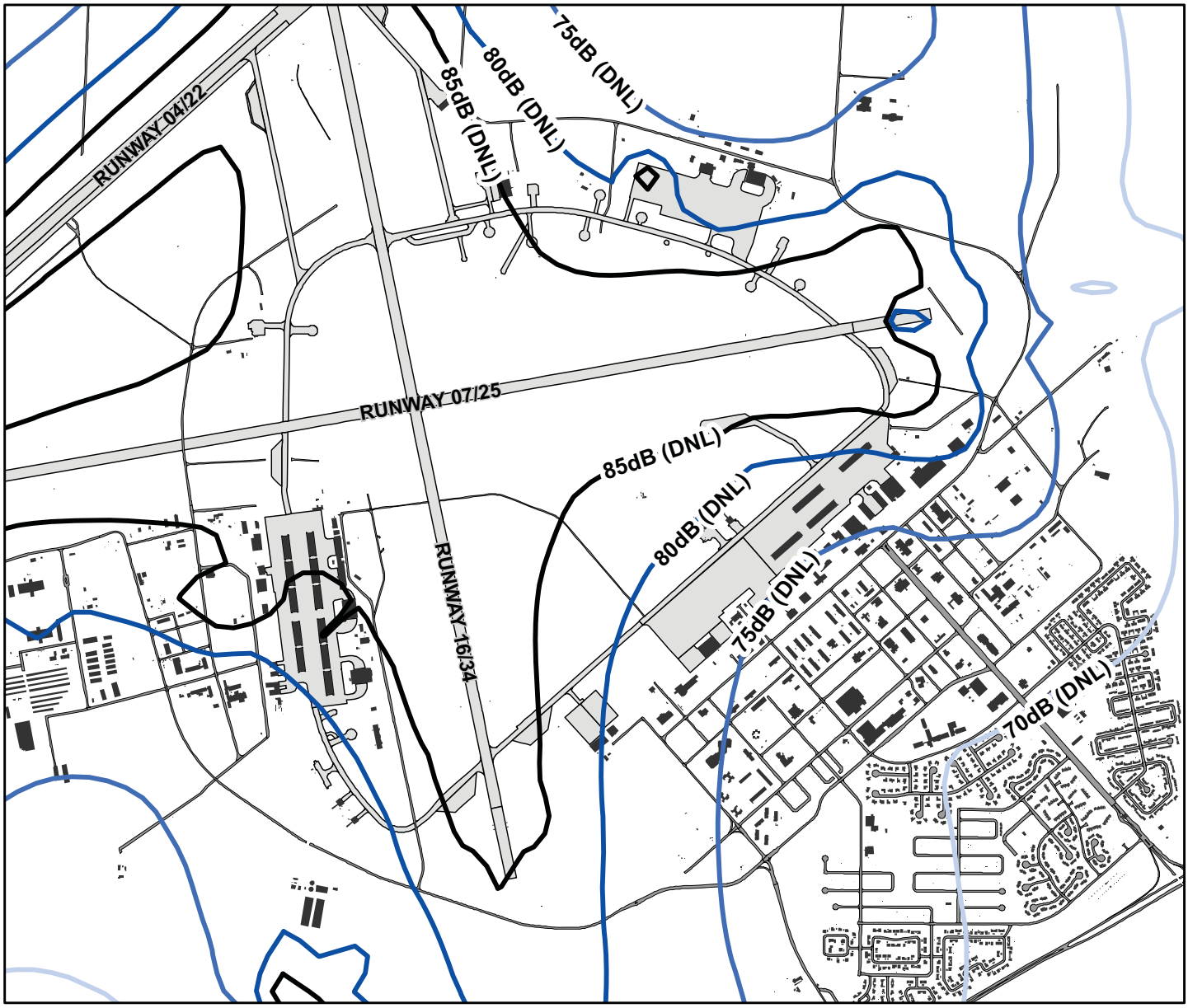


Figure 1.4 Noise Contours

UAS flight outside of restricted airspace requires an FAA approved COA.

Competition for WSMR airspace is stringent, but flexible and dynamic scheduling should create ample opportunities for MQ-1/MQ-9 training. The Joint Test and Training Initiative (JTTI) is a consortium of scheduling functions from Fort Bliss, WSMR, and Holloman AFB. The Southwest JTTI objective is more efficient use of airspace and should provide Holloman-based aircraft more training time in restricted airspace. WSMR is interested in making the UAS mission a reality at Holloman AFB. The C-Band issues would need to be addressed, but are manageable from their perspective. WSMR and the 49 WG are in agreement that the MQ-1 and MQ-9 could operate within the airspace with minor disruptions to current operations. It should be noted that use of the Centennial Range with a COA from the FAA and the use of an auxiliary field for pattern work would be the preferred solution.

MQ-1/MQ-9s would be able to depart Holloman northbound for WSMR airspace and ranges while remaining totally within R-5107 BICIDIH. If scheduling doesn't allow access to these areas, alternatives would be to depart southbound climbing to FL-180 in R-5107D

to cross the Valmont Air Traffic Control Assigned Airspace (ATCAA) to enter R-5103C or B. Mitigating safety concerns along with new COAs would allow access to additional USAF managed training airspace (outside WSMR) in Beak, Talon, Bronco, or Pecos Military Operations Areas (MOAs), and Beak, Cowboy, Talon, and Pecos ATCAAs.

Additional airspace for training could include the Fort Bliss MOA provided Albuquerque Center allows the establishment of a corridor to permit transit between WSMR and Fort Bliss areas. The flying operations could include the new area of the Centennial Range. The auxiliary airfields Stallion and Oscura could provide UAS an auxiliary field for additional pattern work with Oscura being the optimal choice. Condron resides outside of restricted airspace and probably was the least desirable of the three as an auxiliary field.

Holloman AFB has access to a generous amount of DoD managed airspace to conduct UAS training activities and provides excellent airspace and ranges.

4.3 Antiterrorism/Force Protection (AT/FP)

The Air Force AT/FP program seeks to deter or blunt terrorist acts against the U.S. Air Force personnel and assets. Detailed AT/FP guidance is provided in Unified Facilities Criteria (UFC) 4-010-01, DoD Minimum Antiterrorism Standards for Buildings, dated 8 October 2003.

The initial step in the AT/FP process is to determine the appropriate category for each facility, e.g., primary gathering building, inhabited building, or not affected. Inhabited buildings are those defined as buildings or portions of buildings routinely occupied by five or more DoD personnel and with a population density of greater than one person per 430 gross square feet. This density generally excludes industrial, maintenance, and storage facilities except for more densely populated portions of those buildings such as administrative areas. Primary gathering buildings are defined as inhabited buildings or portions thereof where 50 or more DoD personnel routinely gather.

In those cases where a single facility falls into more than one category, such as Supply, the overall rating for the building is considered to be a primary gathering building. However, building layout may provide a basis for applying AT/FP criteria to the administrative portion only and not the warehouse portion.

Appropriate stand-off distance must be provided from buildings to roadways, parking areas, aid controlled perimeters (base boundary) to best protect personnel within. Minimums and-off distances and building separations presented below are based on conventional construction techniques-building construction that is not specifically designed to resist weapons or explosives. Conventional construction is designed only to resist common loadings and environmental effects such as wind, snow, and seismic loads. However, with appropriate analysis accomplished during the design process, stand-off distances and building separations may be significantly reduced.

4.4 Noise Impacts

Holloman Air Force Base currently has an existing Air Installations and Compatible Use Zone (AICUZ) document that depicts the average day-night noise conditions at the base. Noise levels are measured using a Day-Night Average A-Weighted Sound Level (DNL) noise metric. The DNL metric, given as a value in decibels (dB), represents a day-night average (DNL) level of exposure for a typical 24-hour period of flying activity at the installation. Noise contours indicate the DNL exposure levels on the proposed site and adjacent areas during a typical 24-hour day of flying activity.

Noise contours calculated for Holloman AFB range from DNL 65 to DNL 80. Primary operations that contribute to noise levels consist of the F-4, T-38, Tornado, F-117A, and F-22 aircraft currently assigned to the installation. Noise levels below DNL 65 (i.e., outside the noise contours) are not generally considered to be at an annoyance level. However, noise contours in the Option A MQ-1/MQ-9 beddown area have been determined to be between 70 and 75 DNL.

4.5 Traffic and Circulation

The current transportation and circulation system for the Option A MQ-1/MQ-9 beddown area appears to function adequately in its current configuration. As this area is upgraded and enhanced along with new facility construction, opportunities to improve parking and circulation will appear.

The current General Plan Update lists several short-term and long-term projects near the Option A MQ-1/MQ-9 beddown area. Specifically, area just to the east of the proposed beddown location will benefit from the upgrade of Arizona Avenue, the realignment of Fourth Street/Idaho intersection, closing New Mexico to cut off traffic through the community center, and the extension of Arizona Avenue to West Gate Avenue. Long-term improvements planned for the area include extending Delaware Avenue to Forty-Niner/West Gate Avenue. These short and long term improvements should help with vehicular travel in the area.

In order to enhance the pedestrian and bicycle use in the area, any major street upgrades should include bike lanes and multi-use paths adjacent to the roadway. It is equally important to ensure that adequate landscape plans are also completed with the design of future improvements. Not only is this compatible with the Base's Landscape Maintenance Plan, but it also creates a more pedestrian/cyclist friendly environment with trees for shade, and plantings for screening and vehicular traffic separation. Internal to the installation, a pedestrian walkway system will link high-use facilities to one another. The system should be designed to encourage individuals to walk or bike rather than rely on some other form of motorized transportation.

As buildings are refurbished, rebuilt, demolished, or relocated, parking can be re-configured to create a more campus like atmosphere, enhance AT/FP, and increase available parking where there are currently shortages of spaces.

The Area Development Plan will accommodate the additional traffic flow and parking demands that are anticipated with the MQ-1/MQ-9 UAS mission. Parking requirements will be approximately 517 parking spaces for non-organizational parking.

As a side note to overall traffic issues, road work is required along the haul route inside the MSA to support the MQ-1/MQ-9 UAS mission. Existing asphalt roads have failed and are required to be upgraded to support the new munitions requirements.

5.0 Capital Improvement Program

PROJECT #	FY09 MILCON SCOPE DESCRIPTION	PRIORITY	REMARKS
KWRD 093011	UAS FTU OPERATIONS COMPLEX (START OCT 09)		NOMINAL 18-MONTH PERFORMANCE PERIOD (COMPL APR 11)
	ADAL SQUADRON OPERATIONS, BLDG 318 (First Half)	1	TARGET INERIM BOD - JAN 11
	ADAL SQUADRON OPERATIONS, BLDG 318 (Second Half)	2	TARGET FINAL BOD - MAR 11
	LIVE ORDNANCE LOAD AREA	3	TARGET COMPLETION DATE - JUL 11
KWRD 093012	UAS FTU MAINTENANCE COMPLEX (START OCT 09)		NOMINAL 18-MONTH PERFORMANCE PERIOD (COMPL APR 11)
	PGM FACILITY	1	TARGET BOD - OCT 10
	ALTER HANGAR 500	2	TARGET BOD - JAN 11
	AMU/AMXS ADDITION	3	TARGET BOD - APR 11
	HAYMAN STORAGE FACILITY	4	TARGET BOD - JUL 10
	PARALLEL TAXIWAY	5	TARGET COMPLETION DATE - OCT 11

PROJECT #	FY09 MILCON SCOPE DESCRIPTION	PRIORITY	REMARKS
KWRD xxxxxx	ADAL UAS MAINTENANCE HANGAR		NOMINAL 18-MONTH PERFORMANCE PERIOD
	ALTER HANGAR 301	LS	DEMO; FIRE SUPPRESSION; POWER; HVAC; ROLL-UP DOORS
	AIRCRAFT MAINTENANCE UNIT	12,000 SF	DESIGNED/CONSTRUCTED TO AFH 32-1084 REQUIREMENTS

PROJECT #	FY09 O&M PROJECT DESCRIPTION	SCOPE	CWE ($000)	REMARKS
	PROJECT DESIGN/EXECUTION/INSPECTION/CLOSE-OUT	LS		REQUIRE ADDITIONAL/DEDICATED CE PMs
KWRD xxxxxx	REPAIR HANGAR 301	LS	1,500	SSMR; COMM ALLIED SPT FOR NORTH WING
KWRD 080158	ALLIED SUPPORT, GCS COMPOUND SECURITY/PRIMARY POWER	LS	700	FENCING; PERM POWER; COMM ALLIED SPT
KWRD 080154	REPAIR HANGAR 500	20,000 SF	3,500	SSMR; POWER UPGRADE; COMM ALLIED SPT
KWRD 010115	INSTALL FIRE SUPPRESSION, B500	LS	1,500	LIFE SAFETY CODE COMPLIANCE
KWRD 080159	REPAIR FTU SCHOOLHOUSE, B513	10,000 SF	1,400	INTERIOR REPAIR; PMATS POWER/HVAC
KWRD 020008	REPAIR HANGAR 500 EAST APRON	8,500 SM	1,500	ACC PAVEMENT
KWRD 080156	ALLIED SUPPORT, AIRCRAFT SUNSHADES	4 each	600	COORD WITH EAST APRON PROJECT
KWRD xxxxxx	ALLIED SUPPORT, PERMANENT GDTs	7 towers	700	FOUNDATIONS; POWER; COMM ALLIED SPT
KWRD xxxxxx	REPAIR SHEET METAL SHOP, BLDG 883	LS	500	FLOOR; ADMIN SPACE; POWER UPGRADE (FY10)
	FY09 O&M Total		**11,900**	

PROJECT #	FY09 O&M PROJECT DESCRIPTION	SCOPE	CWE ($000)	REMARKS
KWRD 090036	REPAIR HANGAR 500 WEST APRON	9,050 SM	2,000	PCC PAVEMENT (FY10)
KWRD xxxxxx	ALLIED SUPPORT, AIRCRAFT SUNSHADES	4 each	700	COORD WITH WEST APRON PROJECT (FY10)
KWRD 010114	INSTALL FIRE SUPPRESSION, B315	LS	500	LIFE SAFETY CODE COMPLIANCE (FY10)
KWRD 080133	REPAIR MSA HAUL ROUTE	9,100 SM	600	FROM STORAGE IGLOOS TO MSA ECP (FY10)
KWRD 080155	CONSTRUCT COVERED MQ-1 CASKET STORAGE	5,000 SF	300	CANOPY ONLY (FY10)
KWRD 080162	REPAIR VQ FOR PIPELINE STUDENTS, B337	24,841 SF	4,000	36 SUITES (FY10)
KWRD xxxxxx	REPAIR SQUAD OPS, BLDG 302	LS	500	OPS CELLS; COMM CLOSETS (FY10)
KWRD 080152	REPAIR MSA INSPECTION BAY, BLDG 1222	1,500 SF	300	DEMO PAINT BOOTH INSERT (FY10)
KWRD 080153	CONSTRUCT MSA PARKING	20 stalls	100	POV PARKING FOR UMD PLUS-UP (FY10)
KWRD 080148	REPAIR SPACE FOR WEAPONS VAULT, B310	670 SF	400	MOBILITY ASSET PLUS-UP (FY10)
KWRD 080163	CONSTRUCT COVERED MQ-9 CASKET STORAGE	10,000 SF	500	CANOPY ONLY (FY11)
KWRD 080157	ALLIED SUPPORT, AIRCRAFT SUNSHADES, LIVE LOAD AREA	LS	700	AFTER LOLA MILCON COMPLETION (FY11)
KWRD 080161	REPAIR VQ FOR PIPELINE STUDENTS, B330	16,060 SF	3,000	24 SUITES (FY11)
	O&M Total		**13,600**	


NO SMOKING

APPENDIX B
LIST OF ENDANGERED, THREATENED, AND SENSITIVE SPECIES

Biota Information System Of New Mexico

Providing New Mexico and its wildlife Year-round Excellent Service

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Disclaimer Policy

Print Page

Database Query

Your search terms were as follows:

21 species returned.

Taxonomic Group	# Species	Taxonomic Group	# Species
Birds	18	Mammals	3

Export to Excel

Common Name	Scientific Name	Habitat Map	Species Photo (click photo to enlarge)	Category Name	County	Status
Black-Hawk, Common	Buteogallus anthracinus anthracinus (NM)	no map		Birds	Dona Ana	State NM: Threatened
Bunting, Varied	Passerina versicolor versicolor (NM);dickeyae (NM)	no map		Birds	Dona Ana	State NM: Threatened
Cormorant, Neotropic	Phalacrocorax brasilianus	no map		Birds	Dona Ana	State NM: Threatened
Eagle, Bald	Haliaeetus leucocephalus alascanus (NM)	no map		Birds	Dona Ana	State NM: Threatened
Falcon, Aplomado	Falco femoralis septentrionalis (NM)	no map		Birds	Dona Ana	State NM: Endangered
Falcon, Peregrine	Falco peregrinus anatum	no map		Birds	Dona Ana	State NM: Threatened
Falcon, Peregrine, Arctic	Falco peregrinus tundrius	no map	no photo	Birds	Dona Ana	State NM: Threatened
Flycatcher, Willow, SW.	Empidonax traillii extimus	no map		Birds	Dona Ana	State NM: Endangered

						
Ground-dove, Common	Columbina passerina pallescens (NM)	no map		Birds	Dona Ana	State NM: Endangered
Hummingbird, Broad-billed	Cynanthus latirostris magicus (NM)	no map		Birds	Dona Ana	State NM: Threatened
Hummingbird, Costa's	Calypte costae	no map		Birds	Dona Ana	State NM: Threatened
Hummingbird, Violet-crowned	Amazilia violiceps ellioti (NM)	no map		Birds	Dona Ana	State NM: Threatened
Nightjar, Buff-collared	Caprimulgus ridgwayi ridgwayi (NM)	no map	no photo	Birds	Dona Ana	State NM: Endangered
Pelican, Brown	Pelecanus occidentalis carolinensis (NM)	no map		Birds	Dona Ana	State NM: Endangered
Sparrow, Baird's	Ammodramus bairdii	no map		Birds	Dona Ana	State NM: Threatened
Tern, Least	Sterna antillarum athalassos (NM)	no map		Birds	Dona Ana	State NM: Endangered
Vireo, Bell's	Vireo bellii arizonae (NM,AZ);medius (NM)	no map		Birds	Dona Ana	State NM: Threatened
Vireo, Gray	Vireo vicinior			Birds	Dona Ana	State NM: Threatened
Bat, Spotted	Euderma maculatum		no photo	Mammals	Dona Ana	State NM: Threatened
Chipmunk, Colorado, Organ Mtns.	Neotamias quadrivittatus australis (NM)	no map		Mammals	Dona Ana	State NM: Threatened
Sheep, Bighorn, Desert	Ovis canadensis mexicana (endangered	no map		Mammals	Dona Ana	State NM: Endangered

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Results of County Search

OTERO	
Scientific name	County-NM
Anulocaulis leiosolenus var. howardii	Otero
Aquilegia chaplinei	Eddy, Otero
Argemone pleiacantha ssp. pinnatisecta	Otero
Astragalus altus	Otero
Astragalus neomexicanus	Chaves, Lincoln, Otero
Cirsium inornatum	Lincoln, Otero
Cirsium vinaceum	Otero
Cirsium wrightii	Chaves, Guadalupe, Otero, Sierra, Socorro
Delphinium novomexicanum	Lincoln, Otero
Draba standleyi	Dona Ana, Otero, Sierra, Socorro
Echinocereus fendleri var. kuenzleri	Chaves, Eddy, Lincoln, Otero
Ericameria nauseosa var. texensis	Eddy, Otero
Erigeron rybius	Lincoln, Otero
Eriogonum wootonii	Lincoln, Otero
Escobaria villardii	Dona Ana, Otero
Hedeoma pulcherrimum	Lincoln, Otero
Hedeoma todsenii	Otero, Sierra
Heuchera wootonii	Catron, Lincoln, Otero
Hexalectris nitida	Eddy, Otero
Hexalectris spicata var. arizonica	Dona Ana, Hidalgo, Otero, Sierra
Lepidospartum burgessii	Otero
Lupinus sierrae-blancae	Lincoln, Otero
Mentzelia humilis var. guadalupensis	Otero
Microthelys rubrocallosa	Otero
Muhlenbergia villiflora var. villosa	Eddy, Otero
Nama xylopodum	Chaves, Eddy, Otero
Penstemon alamosensis	Dona Ana, Lincoln, Otero
Penstemon cardinalis ssp. cardinalis	Lincoln, Otero
Penstemon cardinalis ssp. regalis	Eddy, Otero
Penstemon neomexicanus	Lincoln, Otero
Perityle staurophylla var. staurophylla	Dona Ana, Otero, Sierra
Philadelphus microphyllus var. argyrocalyx	Lincoln, Otero
Physaria aurea	Lincoln, Otero
Potentilla sierrae-blancae	Lincoln, Otero
Ribes mescalerium	Lincoln, Otero
Sedum integrifolium ssp. neomexicanum	Lincoln, Otero

Senecio sacramentanus	Lincoln, Otero
Sibara grisea	Chaves, Eddy, Otero
Sophora gypsophila var. guadalupensis	Eddy, Otero
Synthyris oblongifolia	Lincoln, Otero
Valeriana texana	Eddy, Lincoln, Otero

Photo credits in header *Peniocereus greggii var. greggii* © T. Todsen, *Lepidospartum burgessii* © M. Howard, *Argemone pleiacantha ssp. pinnatisecta* © R. Sivinski

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Database Query

Your search terms were as follows:

12 species returned.

Taxonomic Group	# Species	Taxonomic Group	# Species
Fish	1	Birds	9
Amphibians	1	Mammals	1

Export to Excel

Common Name	Scientific Name	Habitat Map	Species Photo (click photo to enlarge)	Category Name	County	Status
Pupfish, White Sands	Cyprinodon tularosa		no photo	Fish	Lincoln	State NM: Threatened
Salamander, Sacramento Mtn.	Aneides hardii	no map		Amphibians	Lincoln	State NM: Threatened
Black-Hawk, Common	Buteogallus anthracinus anthracinus (NM)	no map		Birds	Lincoln	State NM: Threatened
Eagle, Bald	Haliaeetus leucocephalus alascanus (NM)	no map		Birds	Lincoln	State NM: Threatened
Falcon, Peregrine	Falco peregrinus anatum	no map		Birds	Lincoln	State NM: Threatened
Falcon, Peregrine, Arctic	Falco peregrinus tundrius	no map	no photo	Birds	Lincoln	State NM: Threatened
Flycatcher, Willow, SW.	Empidonax traillii extimus	no map		Birds	Lincoln	State NM: Endangered
Hummingbird, Broad-billed	Cynanthus latirostris magicus (NM)	no map		Birds	Lincoln	State NM: Threatened

Pelican, Brown	Pelecanus occidentalis carolinensis (NM)	no map		Birds	Lincoln	State NM: Endangered
Sparrow, Baird's	Ammodramus bairdii	no map		Birds	Lincoln	State NM: Threatened
Vireo, Gray	Vireo vicinior			Birds	Lincoln	State NM: Threatened
Chipmunk, Least, Penasco	Neotamias minimus atristriatus (NM)	no map	no photo	Mammals	Lincoln	State NM: Endangered

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Database Query

Your search terms were as follows:

23 species returned.

Taxonomic Group	# Species	Taxonomic Group	# Species
Fish	1	Birds	17
Amphibians	1	Mammals	3
Reptiles	1		

Export to Excel

Common Name	Scientific Name	Habitat Map	Species Photo (click photo to enlarge)	County	Status
Pupfish, White Sands	Cyprinodon tularosa		no photo	Otero	State NM: Threatened
Salamander, Sacramento Mtn.	Aneides hardii	no map		Otero	State NM: Threatened
Rattlesnake, Rock, Mottled	Crotalus lepidus lepidus (NM)	no map		Otero	State NM: Threatened
Black-Hawk, Common	Buteogallus anthracinus anthracinus (NM)	no map		Otero	State NM: Threatened
Bunting, Varied	Passerina versicolor versicolor (NM);dickeyae (NM)	no map		Otero	State NM: Threatened
Cormorant, Neotropic	Phalacrocorax brasilianus	no map		Otero	State NM: Threatened
Eagle, Bald	Haliaeetus leucocephalus alascanus (NM)	no map		Otero	State NM: Threatened

Falcon, Aplomado	Falco femoralis septentrionalis (NM)	no map		Otero	State NM: Endangered
Falcon, Peregrine	Falco peregrinus anatum	no map	no photo	Otero	State NM: Threatened
Falcon, Peregrine, Arctic	Falco peregrinus tundrius	no map	no photo	Otero	State NM: Threatened
Flycatcher, Willow, SW.	Empidonax traillii extimus	no map		Otero	State NM: Endangered
Ground-dove, Common	Columbina passerina pallescens (NM)	no map		Otero	State NM: Endangered
Hummingbird, Broad-billed	Cynanthus latirostris magicus (NM)	no map		Otero	State NM: Threatened
Hummingbird, White-eared	Hylocharis leucotis borealis (NM)	no map		Otero	State NM: Threatened
Pelican, Brown	Pelecanus occidentalis carolinensis (NM)	no map		Otero	State NM: Endangered
Sparrow, Baird's	Ammodramus bairdii	no map		Otero	State NM: Threatened
Tern, Least	Sterna antillarum athalassos (NM)	no map		Otero	State NM: Endangered
Trogon, Elegant	Trogon elegans canescens (NM)	no map		Otero	State NM: Endangered
Vireo, Bell's	Vireo bellii arizonae (NM,AZ);medius (NM)	no map		Otero	State NM: Threatened
Vireo, Gray	Vireo vicinior			Otero	State NM: Threatened
Bat, Spotted	Euderma maculatum		no photo	Otero	State NM: Threatened

Chipmunk, Least, Penasco	Neotamias minimus atristriatus (NM)	no map	no photo	Otero	State NM: Endangered
Mouse, Jumping, Meadow	Zapus hudsonius luteus (NM,AZ)	no map		Otero	State NM: Endangered

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Database Query

Your search terms were as follows:

24 species returned.

Taxonomic Group	# Species	Taxonomic Group	# Species
Fish	3	Mammals	2
Birds	19		

Export to Excel

Common Name	Scientific Name	Habitat Map	Species Photo (click photo to enlarge)	Category Name	County	Status
Chub, Headwater	Gila nigra		no photo	Fish	Sierra	State NM: Endangered
Pupfish, White Sands	Cyprinodon tularosa		no photo	Fish	Sierra	State NM: Threatened
Trout, Gila	Oncorhynchus gilae			Fish	Sierra	State NM: Threatened
Black-Hawk, Common	Buteogallus anthracinus anthracinus (NM)	no map		Birds	Sierra	State NM: Threatened
Bunting, Varied	Passerina versicolor versicolor (NM);dickeyae (NM)	no map		Birds	Sierra	State NM: Threatened
Cormorant, Neotropic	Phalacrocorax brasilianus	no map		Birds	Sierra	State NM: Threatened
Eagle, Bald	Haliaeetus leucocephalus alascanus (NM)	no map		Birds	Sierra	State NM: Threatened
Falcon, Aplomado	Falco femoralis septentrionalis (NM)	no map		Birds	Sierra	State NM: Endangered

Falcon, Peregrine	Falco peregrinus anatum	no map		Birds	Sierra	State NM: Threatened
Falcon, Peregrine, Arctic	Falco peregrinus tundrius	no map	no photo	Birds	Sierra	State NM: Threatened
Flycatcher, Willow, SW.	Empidonax traillii extimus	no map		Birds	Sierra	State NM: Endangered
Ground-dove, Common	Columbina passerina pallescens (NM)	no map		Birds	Sierra	State NM: Endangered
Hummingbird, Broad-billed	Cynanthus latirostris magicus (NM)	no map		Birds	Sierra	State NM: Threatened
Hummingbird, Costa's	Calypte costae	no map		Birds	Sierra	State NM: Threatened
Hummingbird, Lucifer	Calothorax lucifer		no photo	Birds	Sierra	State NM: Threatened
Kingbird, Thick-billed	Tyrannus crassirostris	no map	no photo	Birds	Sierra	State NM: Endangered
Pelican, Brown	Pelecanus occidentalis carolinensis (NM)	no map		Birds	Sierra	State NM: Endangered
Sparrow, Baird's	Ammodramus bairdii	no map		Birds	Sierra	State NM: Threatened
Tern, Least	Sterna antillarum athalassos (NM)	no map		Birds	Sierra	State NM: Endangered
Trogon, Elegant	Trogon elegans canescens (NM)	no map		Birds	Sierra	State NM: Endangered
Vireo, Bell's	Vireo bellii arizonae (NM,AZ);medius (NM)	no map		Birds	Sierra	State NM: Threatened
Vireo, Gray	Vireo vicinior			Birds	Sierra	State NM: Threatened

Sheep, Bighorn, Desert	Ovis canadensis mexicana (endangered pops)	no map		Mammals	Sierra	State NM: Endangered
Wolf, Gray, Mexican	Canis lupus baileyi (NM,AZ)	no map		Mammals	Sierra	State NM: Endangered

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Database Query

Your search terms were as follows:

22 species returned.

Taxonomic Group	# Species	Taxonomic Group	# Species
Fish	2	Mammals	4
Birds	16		

Export to Excel

Common Name	Scientific Name	Habitat Map	Species Photo (click photo to enlarge)	Category Name	County	Status
Chub, Headwater	Gila nigra		no photo	Fish	Socorro	State NM: Endangered
Minnow, Silvery, Rio Grande	Hybognathus amarus	no map	no photo	Fish	Socorro	State NM: Endangered
Black-Hawk, Common	Buteogallus anthracinus anthracinus (NM)	no map		Birds	Socorro	State NM: Threatened
Bunting, Varied	Passerina versicolor versicolor (NM);dickeyae (NM)	no map		Birds	Socorro	State NM: Threatened
Cormorant, Neotropic	Phalacrocorax brasilianus	no map		Birds	Socorro	State NM: Threatened
Eagle, Bald	Haliaeetus leucocephalus alascanus (NM)	no map		Birds	Socorro	State NM: Threatened
Falcon, Aplomado	Falco femoralis septentrionalis (NM)	no map		Birds	Socorro	State NM: Endangered
Falcon, Peregrine	Falco peregrinus anatum	no map		Birds	Socorro	State NM: Threatened

Falcon, Peregrine, Arctic	Falco peregrinus tundrius	no map	no photo	Birds	Socorro	State NM: Threatened
Flycatcher, Willow, SW.	Empidonax traillii extimus	no map		Birds	Socorro	State NM: Endangered
Ground-dove, Common	Columbina passerina pallescens (NM)	no map		Birds	Socorro	State NM: Endangered
Hummingbird, Violet-crowned	Amazilia violiceps ellioti (NM)	no map		Birds	Socorro	State NM: Threatened
Pelican, Brown	Pelecanus occidentalis carolinensis (NM)	no map		Birds	Socorro	State NM: Endangered
Plover, Piping	Charadrius melodus circumcinctus (NM)	no map	no photo	Birds	Socorro	State NM: Threatened
Sparrow, Baird's	Ammodramus bairdii	no map		Birds	Socorro	State NM: Threatened
Tern, Least	Sterna antillarum athalassos (NM)	no map		Birds	Socorro	State NM: Endangered
Vireo, Bell's	Vireo bellii arizonae (NM,AZ);medius (NM)	no map		Birds	Socorro	State NM: Threatened
Vireo, Gray	Vireo vicinior			Birds	Socorro	State NM: Threatened
Bat, Spotted	Euderma maculatum		no photo	Mammals	Socorro	State NM: Threatened
Chipmunk, Colorado, Oscura Mtns.	Neotamias quadrivittatus oscuraensis (NM)	no map	no photo	Mammals	Socorro	State NM: Threatened
Mouse, Jumping, Meadow	Zapus hudsonius luteus (NM,AZ)	no map		Mammals	Socorro	State NM: Endangered
Sheep, Bighorn, Desert	Ovis canadensis mexicana (endangered pops)	no map		Mammals	Socorro	State NM: Endangered

APPENDIX C
AIR QUALITY CALCULATIONS

CALCULATION SHEET-COMBUSTIBLE EMISSIONS-EDWARDS AFB

Assumptions for Combustable Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Road Compactors	1	100	8	120	96000
Diesel Dump Truck	1	300	8	90	216000
Diesel Excavator	0	300	8	90	0
Diesel Hole Trenchers	1	175	8	90	126000
Diesel Bore/Drill Rigs	0	300	8	90	0
Diesel Cement & Mortar Mixers	1	300	8	90	216000
Diesel Cranes	1	175	8	90	126000
Diesel Graders	1	300	8	90	216000
Diesel Tractors/Loaders/Backhoes	1	100	8	180	144000
Diesel Bull Dozers	0	300	8	40	0
Diesel Front End Loaders	1	300	8	40	96000
Diesel Fork Lifts	2	100	8	40	64000
Diesel Generator Set	4	40	8	40	51200

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Trenchers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Diesel Bore/Drill Rigs	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Diesel Cement & Mortar Mixers	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTIBLE EMISSIONS-EDWARDS AFB

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Paver	0.039	0.157	0.518	0.036	0.035	0.078	56.726
Diesel Dump Truck	0.105	0.493	1.307	0.098	0.095	0.176	127.585
Diesel Excavator	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Hole Cleaners\Trenchers	0.071	0.339	0.807	0.064	0.061	0.103	74.397
Diesel Bore/Drill Rigs	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cement & Mortar Mixers	0.145	0.552	1.733	0.114	0.112	0.174	126.086
Diesel Cranes	0.061	0.181	0.794	0.047	0.046	0.101	73.619
Diesel Graders	0.083	0.324	1.126	0.079	0.076	0.176	127.657
Diesel Tractors/Loaders/Backhoes	0.294	1.303	1.146	0.217	0.211	0.151	109.669
Diesel Bull Dozers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Front End Loaders	0.040	0.164	0.529	0.037	0.036	0.078	56.726
Diesel Aerial Lifts	0.140	0.547	0.604	0.098	0.095	0.067	48.721
Diesel Generator Set	0.068	0.212	0.337	0.041	0.040	0.046	33.137
Total Emissions	**1.325**	**5.585**	**12.385**	**1.091**	**1.061**	**1.620**	**1174.549**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-EDWARDS AFB

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	15	15	0.32	0.38	0.71
CO	12.4	15.7	60	240	15	15	2.95	3.74	6.69
NOx	0.95	1.22	60	240	15	15	0.23	0.29	0.52
PM-10	0.0052	0.0065	60	240	15	15	0.00	0.00	0.00
PM 2.5	0.0049	0.006	60	240	15	15	0.00	0.00	0.00

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Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02

Daily Commute New Staff									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	30	240	400	400	4.32	5.11	9.43
CO	12.4	15.7	30	240	400	400	39.35	49.83	89.18
NOx	0.95	1.22	30	240	400	400	3.02	3.87	6.89
PM-10	0.0052	0.0065	30	240	400	400	0.02	0.02	0.04
PM 2.5	0.0049	0.006	30	240	400	400	0.02	0.02	0.03

Truck Emission Factor Source: USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway vehicle emission factor model.

AIR EMISSIONS AIRCRAFT MQ-1 AND MQ-9-EDWARDS AFB

New Sortie Emissions										
	Emission Factors		Assumptions					Results by Pollutant		
Pollutants	MQ-1 lbs/hr	MQ-9 lbs/hr	Sorties/yr (1)	Hrs/sortie	Total Number of MQ-1 Sortie hrs	Total Number of MQ-9 Sortie hrs	Percent of time in air mixing zone (2)	Total Emissions MQ-1 tns/yr	Total Emissions MQ-9 tns/yr	Total tns/yr
VOCs	1.64	1.64	1440	12	17280	17280	5%	0.71	0.71	1.42
CO	3.51	3.51	1440	12	17280	17280	5%	1.52	1.52	3.03
NOx	3.84	3.84	1440	12	17280	17280	5%	1.66	1.66	3.32
PM-10	0.55	0.55	1440	12	17280	17280	5%	0.24	0.24	0.48
PM 2.5	0.137	0.137	1440	12	17280	17280	5%	0.06	0.06	0.12

Source of Emission Factors: Tetra-Tech 2006

1. Total 2,880 sorties and assumed that half of total sorties would be MQ1 and other half MQ-9.

2.The United States Environmental Protection Agency (U.S. EPA) typically uses 3,000 feet above ground level (AGL) as the default mixing height that inhibits the rapid vertical transfer of air. Pollutants emitted above the mixing height become diluted in the very large volume of air in the troposphere before they are slowly transported down to ground level. These emissions above 3,000 AGL have little or no effect on ambient air quality. Therefore, air quality impacts below 3,000 feet AGL are the emphasis of the daily air quality assessment analysis. The majority of emissions from criteria air pollutants, or precursors thereof, for the Proposed Action are expected to occur above the mixing height of 3,000 feet AGL. Approximately 5 percent of the flight time for consolidated mission events would generate emissions below 3,000 feet AGL and would be associated with takeoff and landing at Holloman AFB (Edwards AFB 2008) .

EF Source: Tetra Tech. 2006. Environmental Assessment for Routine and Recurring Unmanned Aerial Vehicle Flight Operations at 38 Edwards Air Force Base, California. November 2006

Conversion factor lbs to tons 2000

CALCULATION SHEET-FUGITIVE DUST-EDWARDS AFB

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006

PM2.5 Emissions

PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

			Conversion Factors	
Duration of Construction Project	12	months	0.000022957	acres per feet
Length	0	miles	5280	feet per mile
Length (converted)	0	feet		
Width	0	feet		
Area	2.00	acres		

Staging Areas

Duration of Construction Project		months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	4.56	2.28	0.46	0.23
Staging Areas	0.00	0.00	0.00	0.00
Total	**4.56**	**2.28**	**0.46**	**0.23**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-EDWARDS AFB

Proposed Action Construction Emissions for Criteria Pollutants (tons per year)						
Emission source	VOC	CO	NOx	PM-10	PM-2.5	SO2
Combustible Emissions	1.33	5.58	12.38	1.09	1.06	1.62
Construction Site-fugitive PM-10	NA	NA	NA	2.28	0.23	NA
Construction Workers Commuter & Trucking	0.73	6.83	1.07	0.02	0.02	NA
Total emissions	**2.06**	**12.42**	**13.46**	**3.39**	**1.31**	**1.62**
De minimis threshold (1)	50.00	NA	50.00	70.00	100.00	NA
Annual Auto Emissions New Residents	9.43	89.18	6.89	0.04	0.03	NA
Annual Emissions Increase Flight Operations	1.42	3.03	3.32	0.48	0.12	NA
Total Ongoing Emission/yr	10.84	92.22	10.20	0.51	0.15	NA

1. De-minimis thresholds for Kern County, the location of the Edwards AFB.

CALCULATION SHEET-COMBUSTIBLE EMISSIONS-HOLLOMAN AFB

Assumptions for Combustible Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Road Compactors	1	100	8	120	96000
Diesel Dump Truck	1	300	8	90	216000
Diesel Excavator	1	300	8	90	216000
Diesel Hole Trenchers	1	175	8	90	126000
Diesel Bore/Drill Rigs	1	300	8	90	216000
Diesel Cement & Mortar Mixers	1	300	8	90	216000
Diesel Cranes	2	175	8	90	252000
Diesel Graders	1	300	8	90	216000
Diesel Tractors/Loaders/Backhoes	1	100	8	180	144000
Diesel Bull Dozers	1	300	8	40	96000
Diesel Front End Loaders	1	300	8	40	96000
Diesel Fork Lifts	2	100	8	40	64000
Diesel Generator Set	6	40	8	40	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Trenchers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Diesel Bore/Drill Rigs	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Diesel Cement & Mortar Mixers	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTIBLE EMISSIONS-HOLLOMAN AFB

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Paver	0.039	0.157	0.518	0.036	0.035	0.078	56.726
Diesel Dump Truck	0.105	0.493	1.307	0.098	0.095	0.176	127.585
Diesel Excavator	0.081	0.309	1.095	0.076	0.074	0.176	127.657
Diesel Hole Cleaners\Trenchers	0.071	0.339	0.807	0.064	0.061	0.103	74.397
Diesel Bore/Drill Rigs	0.143	0.545	1.702	0.119	0.117	0.174	126.086
Diesel Cement & Mortar Mixers	0.145	0.552	1.733	0.114	0.112	0.174	126.086
Diesel Cranes	0.122	0.361	1.588	0.094	0.092	0.203	147.239
Diesel Graders	0.083	0.324	1.126	0.079	0.076	0.176	127.657
Diesel Tractors/Loaders/Backhoes	0.294	1.303	1.146	0.217	0.211	0.151	109.669
Diesel Bull Dozers	0.038	0.146	0.504	0.035	0.034	0.078	56.736
Diesel Front End Loaders	0.040	0.164	0.529	0.037	0.036	0.078	56.726
Diesel Aerial Lifts	0.140	0.547	0.604	0.098	0.095	0.067	48.721
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**1.682**	**6.872**	**16.648**	**1.389**	**1.351**	**2.172**	**1575.215**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-HOLLOMAN AFB

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	15	15	0.32	0.38	0.71
CO	12.4	15.7	60	240	15	15	2.95	3.74	6.69
NOx	0.95	1.22	60	240	15	15	0.23	0.29	0.52
PM-10	0.0052	0.0065	60	240	15	15	0.00	0.00	0.00
PM 2.5	0.0049	0.006	60	240	15	15	0.00	0.00	0.00

-

Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02

Daily Commute New Residents									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	15	240	400	400	2.16	2.55	4.71
CO	12.4	15.7	15	240	400	400	19.68	24.91	44.59
NOx	0.95	1.22	15	240	400	400	1.51	1.94	3.44
PM-10	0.0052	0.0065	15	240	400	400	0.01	0.01	0.02
PM 2.5	0.0049	0.006	15	240	400	400	0.01	0.01	0.02

Truck Emission Factor Source: USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway vehicle emission factor model.

AIR EMISSIONS AIRCRAFT MQ-1 AND MQ-9-EDWARDS AFB

New Sortie Emissions										
	Emission Factors		Assumptions					Results by Pollutant		
Pollutants	MQ-1 lbs/hr	MQ-9 lbs/hr	Sorties/yr (1)	Hrs/sortie	Total Number of MQ-1 Sortie hrs	Total Number of MQ-9 Sortie hrs	Percent of time in air mixing zone (2)	Total Emissions MQ-1 tns/yr	Total Emissions MQ-9 tns/yr	Total tns/yr
VOCs	1.64	1.64	1440	12	17280	17280	5%	0.71	0.71	1.42
CO	3.51	3.51	1440	12	17280	17280	5%	1.52	1.52	3.03
NOx	3.84	3.84	1440	12	17280	17280	5%	1.66	1.66	3.32
PM-10	0.55	0.55	1440	12	17280	17280	5%	0.24	0.24	0.48
PM 2.5	0.137	0.137	1440	12	17280	17280	5%	0.06	0.06	0.12

Source of Emission Factors: Tetra-Tech 2006

1. Total 2,880 sorties and assumed that half of total sorties would be MQ1 and other half MQ-9.

2.The United States Environmental Protection Agency (U.S. EPA) typically uses 3,000 feet above ground level (AGL) as the default mixing height that inhibits the rapid vertical transfer of air. Pollutants emitted above the mixing height become diluted in the very large volume of air ir the troposphere before they are slowly transported down to ground level. These emissions above 3,000 AGL have little or no effect on ambient air quality. Therefore, air quality impacts below 3,000 feet AGL are the emphasis of the daily air quality assessment analysis. The majority of emissions from criteria air pollutants, or precursors thereof, for the Proposed Action are expected to occur above the mixing height of 3,000 feet AGL. Approximately 5 percent of the flight time for consolidated mission events would generate emissions below 3,000 feet AGL and would be associated with takeoff and landing at Holloman AFB (Edwards AFB 2008) .

EF Source: Tetra Tech. 2006. Environmental Assessment for Routine and Recurring Unmanned Aerial Vehicle Flight Operations at 38 Edwards Air Force Base, California. November 2006

Conversion fact 2000

CALCULATION SHEET-FUGITIVE DUST-HOLLOMAN AFB

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006

PM2.5 Emissions

PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

			Conversion Factors	
Duration of Construction Project	12	months	0.000022957	acres per feet
Length	0	miles	5280	feet per mile
Length (converted)	0	feet		
Width	0	feet		
Area	6.00	acres		

Staging Areas

Duration of Construction Project		months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	13.68	6.84	1.37	0.68
Staging Areas	0.00	0.00	0.00	0.00
Total	**13.68**	**6.84**	**1.37**	**0.68**

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions From Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-HOLLOMAN AFB

Proposed Action Construction Emissions for Criteria Pollutants (tons per year)						
Emission source	VOC	CO	NOx	PM-10	PM-2.5	SO2
Combustible Emissions	1.68	6.87	16.65	1.39	1.35	2.17
Construction Site-fugitive PM-10	NA	NA	NA	6.84	0.68	NA
Construction Workers Commuter & Trucking	0.73	6.83	1.07	0.02	0.02	NA
Total emissions	**2.42**	**13.70**	**17.72**	**8.25**	**2.05**	**2.17**
De minimis threshold (1)	50.00	NA	50.00	70.00	100.00	NA
Annual Auto Emissions New Residents	4.71	44.59	3.44	0.02	0.02	NA
Annual Emissions Increase Flight Operations	1.42	3.03	3.32	0.48	0.12	NA
Total Ongoing Emission/yr	6.13	47.62	6.76	0.49	0.14	NA

1. De-minimis thresholds for Kern County, the location of the Edwards AFB.

APPENDIX D
CORRESPONDENCE

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

ARNOLD SCHWARZENEGGER
GOVERNOR

CYNTHIA BRYANT
DIRECTOR

April 16, 2009

Donald Calder
U.S. Air Force, Air Combat Command
HQ ACC/A7PS
129 Andrews St, Ste 102
Langley AFB, VA, CA 23665-2769

Subject: Unmanned Aircraft System (UAS) Second Field Training Unit (FTU-2)
SCH#: 2009034002

Dear Donald Calder:

The State Clearinghouse submitted the above named Joint Document to selected state agencies for review. The review period closed on April 15, 2009, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Please call the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the ten-digit State Clearinghouse number when contacting this office.

Sincerely,

Terry Roberts

Terry Roberts
Director, State Clearinghouse

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# 2009034002
Project Title Unmanned Aircraft System (UAS) Second Field Training Unit (FTU-2)
Lead Agency U.S. Air Force

Type JD Joint Document

Description NOTE: Joint Document is EA/FONSI

The U.S. Airforce, Headquarters Air Combat Command (ACC), proposes to stand-up of a second Unmanned Aircraft System (UAS) FieldTraining Unit (FTU-2) and relocate the existing FTU currently operated at Creech Air Force Base (AFB), Nevada, to another location. The beddown will consist of 36 MQ-1 Predator and MQ-9 Reaper UAS aircraft and up to 800 personnel (600 permanent and 200 students). The proposed action would also involve construction and renovation of facilities to support the beddown.

Lead Agency Contact

Name Donald Calder
Agency U.S. Air Force, Air Combat Command
Phone 757-764-6156 **Fax**
email
Address HQ ACC/A7PS
129 Andrews St, Ste 102
City Langley AFB, VA **State** CA **Zip** 23665-2769

Project Location

County Los Angeles, Kern
City Lancaster
Region
Lat / Long
Cross Streets Edwards Air Force Base and related military airspace
Parcel No.
Township **Range** R-2515 **Section** **Base** Edwards

Proximity to:

Highways
Airports Edwards AFB
Railways
Waterways
Schools
Land Use PLU: commercial, office space, industrial

Project Issues Aesthetic/Visual; Air Quality; Archaeologic-Historic; Biological Resources; Cumulative Effects; Drainage/Absorption; Economics/Jobs; Landuse; Noise; Population/Housing Balance; Other Issues; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Water Quality; Water Supply

Reviewing Agencies Resources Agency; Department of Conservation; Department of Fish and Game, Region 4; Office of Historic Preservation; Department of Parks and Recreation; Caltrans, Division of Aeronautics; California Highway Patrol; Caltrans, District 7; Native American Heritage Commission; State Lands Commission

Date Received 03/17/2009 **Start of Review** 03/17/2009 **End of Review** 04/15/2009

Note: Blanks in data fields result from insufficient information provided by lead agency.

NEW MEXICO
ENVIRONMENT DEPARTMENT

Office of the Secretary

BILL RICHARDSON
Governor

Harold Runnels Building
1190 Saint Francis Drive (87505)
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RON CURRY
Secretary
Jon Goldstein
Deputy Secretary

April 15, 2009

Larry H. Dryden, P.E.
Department of the Airforce
HQ ACC/A7PS
129 Andrews Street, Suite 102
Langley AFB, VA 23665-2769

RE: Beddown of a Second Field Training Unit (FTU) and Relocation of an Existing FTU for Unmanned Aircraft Systems (UAS), Holloman AFB, Otero County

DearMr. Dryden:

Your letter regarding the above named project was received in the New Mexico Environment Department (NMED) and was sent to various Bureaus for review and comment. Comments were provided by the Air Quality and Ground Water Quality Bureaus and are as follows.

Air Quality Bureau
The proposed Beddown of a Second Field Training Unit (FTU) and Relocation of an Existing FTU for Unmanned Aircraft Systems (UAS), Holloman AFB, is located in Otero County. Otero County is currently considered to be in attainment with all New Mexico and National Ambient Air Quality Standards.

Potential exists for temporary increases in dust and emissions associated with earthmoving, construction equipment, and other vehicles. However, the increases should not result in non-attainment of air quality standards. Dust control measures should be taken to minimize the release of particulates due to vehicular traffic and construction. Areas disturbed by the construction activities, within and adjacent to the project area should be reclaimed to avoid long-term problems with erosion and fugitive dust. To further ensure air quality standards are met, applicable local or county regulations requiring noise and/or dust control must be followed. If none are in effect, controlling construction-related air quality impacts during projects should be considered to reduce the impact of fugitive dust and/or noise on community members.

All asphalt, concrete, quarrying, crushing and screening facilities contracted in conjunction with the proposed project must have current and proper air quality permits. For more information on air quality permitting and modeling requirements, please refer to 20.2.72 NMAC. Potential emissions from the diesel generator sets should be calculated assuming continuous operation to

determine whether a construction permit is required in accordance with 20.2.72.200.A.(1) NMAC. The project, as proposed, is not anticipated to contribute negatively to air quality on a long-term basis.

Ground Water Quality Bureau
The Ground Water Quality Bureau (GWQB) staff reviewed the above-referenced letter as requested, focusing specifically on the potential effect to ground water resources in the area of the proposed project.

The letter notes that the Department of the Air Force is considering the relocation of an existing field training unit (FTU) associated with unmanned aircraft systems to Holloman Air Force Base, Alamogordo, New Mexico, and the creation of a second field training unit associated with unmananed aircraft systems, also to be located at Holloman Air Force Base. Assignment of the field training units to Holloman Air Force Base would result in an additional 600 permanent staff and 200 students at the base.

The addition of permanent staff and students to Holloman Air Force Base will increase the volume of domestic wastewater generated at the base. Domestic wastewater is treated in an on-base wastewater plant and numerous septic tanks at various locations on the base; discharges to and from these facilities are regulated by the GWQB under Discharge Permits issued pursuant to the Water Quality Control Commission (WQCC) Regulations. If increased domestic wastewater discharges to the treatment plant caused the volumes discharged to exceed the permitted discharge volume, the Department of the Air Force will be required to propose modification of the Discharge Permit for the treatment plant. Improvements to the treatment plant may be required as part of the Discharge Permit modification if necessary to effectively treat the increased volume of wastewater. If assignment of the field training units will require the installation of additional septic systems or other forms of domestic wastewater treatment, these new systems must be incorporated into an existing Discharge Permit through permit modification, or the Department of the Air Force may submit applications for a new Discharge Permit to address the new systems.

Any improvements to the existing wastewater treatment plant or construction of new wastewater treatment units will likely involve the use of heavy equipment, thereby leading to the possibility of contaminant releases (e.g., fuel, hydraulic fluid, etc.) associated with equipment malfunctions. The GWQB advises all parties involved in the project to be aware of notification requirements for accidental discharges contained in 20.6.2.1203 NMAC. Compliance with the notification and response requirements will further ensure the protection of ground water quality in the vicinity of the project.

I apologize for the delay in getting this response to you. I hope this information is helpful to you.

Sincerely,

Georgia Cleverley

Georgia Cleverley
Environmental Impact Review Coordinator
NMED File #2826

-----Original Message-----
From: Calder, Donald W ACC Civ USAF ACC ACC/A7PS
[mailto:donald.calder@langley.af.mil]
Sent: Tuesday, March 31, 2009 6:39 AM
To: Beason, Mark
Cc: Chris Ingram
Subject: RE: Environmental Assessment for UAS at Edwards AFB

Mark,

Thanks for taking the time to confirm receipt of the EA document. Currently the preferred option is to locate the Field Training Unit at Holloman AFB, NM, but if that changes we will most certainly be in touch with you.

Don Calder
Sustainable Installations Branch (HQ ACC/A7PS)
129 Andrews St, Ste 102
Langley AFB, VA 23665
(757)764-6156

-----Original Message-----
From: Beason, Mark [mailto:mbeason@parks.ca.gov]
Sent: Monday, March 30, 2009 6:17 PM
To: Calder, Donald W ACC Civ USAF ACC ACC/A7PS
Cc: Beason, Mark
Subject: Environmental Assessment for UAS at Edwards AFB

Mr. Calder,

Thank you for submitting the above mentioned EA for our review.

Unfortunately, it is not the policy of this office to comment on environmental documents.

We will be happy to confer with you when you initiate Section 106 consultation for the UAS project in California.

Please feel free to contact me with any other questions you may have.

Mark A. Beason

State Historian II, Project Review

California Office of Historic Preservation

1416 9th Street, Room 1442, Sacramento, CA 95814

(916) 653-8902, fax (916) 653-9824

From: Chris Ingram
Sent: Monday, April 13, 2009 6:20 PM
To: Nicole Forsyth; Shanna McCarty
Subject: Fwd: response FTU-2 EAS Holloman AFB

Attachments: UAS eas letter.doc; ATT00001.htm

Sent from my iPhone

Begin forwarded message:

> **From:** "Calder, Donald W ACC Civ USAF ACC ACC/A7PS" <donald.calder@langley.af.mil>
> **Date:** April 13, 2009 11:54:47 AM CDT
> **To:** Chris Ingram <cingram@gsrcorp.com>
> **Subject: FW: response FTU-2 EAS Holloman AFB**
>
> Chris,
>
> Here's the response I just got from the "Alomogordo Committee of 50" - positive response with no document comments.
>
> Don Calder
>
> -----Original Message-----
> From: Bill Burt [mailto:bburt@bbiradio.net]
> Sent: Monday, April 13, 2009 12:47 PM
> To: Calder, Donald W ACC Civ USAF ACC ACC/A7PS
> Subject: response FTU-2 EAS Holloman AFB
>
> Mr. Calder,
> Thank you for sending me a copy of the EA for the beddown of the FTU-2 at Holloman AFB, NM. Attached is my letter of response. Could you please send back a response that you received this email and the attached letter. Thank you and we look forward to this new mission at ACC's best base...Holloman AFB, NM!!!
> Sincerely, Bill Burt, Alamogordo Committee of 50.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Las Cruces District Office
1800 Marquess
Las Cruces, New Mexico 88005
www.nm.blm.gov

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

1610 (L0000)

APR 24 2009

Mr. Donald Calder
HQ ACC/A7PS
129 Andrews Street, Suite 102
Langley AFB VA 23665-2769

Dear Mr. Calder;

Thank you for the opportunity to comment on the *Environmental Assessment for the MQ-1 Predator and MQ-9 Reaper Unmanned Aircraft System (UAS) Second Field Training Unit (FTU-2) Beddown.*

The unmanned aircraft will fly over McGregor Range, which is managed cooperatively between the Las Cruces District Office of the Bureau of Land Management and Fort Bliss. Protocols for ensuring health and safety outlined in the EA are adequate and in sync with our understanding of the Army's management of McGregor Range and so we have no comments or issues regarding the EA.

Again, thank you for including us in the review process.

Sincerely,

Bill Childress
District Manager

GOVERNOR
Bill Richardson

DIRECTOR AND SECRETARY
TO THE COMMISSION
Tod Stevenson

Robert S. Jenks, Deputy Director

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

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Silver City, NM

Leo V. Sims, II, Commissioner
Hobbs, NM

April 22, 2009

Mr. Donald Calder
ACC Project Manager
HQ ACC/A7PS
Langley AFB VA23665-2769

Re: Environmental Assessment for Beddown of a Second Field Training Unit and Relocation of an Existing FTU for Unmanned Aircraft Systems; NMDGF Doc. No. 12612

Dear Mr. Calder:

The New Mexico Department of Game and Fish (Department) has reviewed the above-referenced Environmental Assessment (EA), which proposes to move an Unmanned Aircraft System (UAS) Field Training Unit (FTU) currently located at Creech Air Force Base (AFB), Nevada, and create a second FTU at the new location. Both Holloman AFB and Edwards AFB, California, are being considered.

The Department does not have major concerns with the relocation of the UAS FTU, and beddown of the second FTU at Holloman AFB. The EA recognized the occurrence of the State-threatened and highly endemic White Sands Pupfish (*Cyprinodon tularosa*), and we trust that project proponents will work with Holloman AFB and White Sands Missile Range to ensure that no impacts from the operation of the UAS FTUs to White Sands Pupfish or their habitats will occur.

Project implementation at Holloman Air Force Base would require the construction of a new taxiway parallel to Runway 16/34, to reduce the amount of taxi time required for UAS platforms to access the primary runways. We have attached a copy of our 2007 Burrowing Owl Survey and Mitigation guidelines. We request that before taxiway construction, seasonally-appropriate Burrowing Owl surveys occur, and if found, measures be taken to ensure that no Burrowing Owls are adversely affected by project activities.

We appreciate the opportunity to comment on this project. Should you have any questions regarding our comments, please contact Mark Watson, Habitat Specialist, of my staff at (505) 476-8115, or <mark.watson@state.nm.us>.

Sincerely,

Terra Manasco
Assistant Chief, Conservation Services Division

TLM/mlw

xc: Wally Murphy (Ecological Services Field Supervisor, USFWS)
Bob Jenks (Deputy Director, NMDGF)
George Farmer (Southeast Area Habitat Specialist, NMDGF)
Pat Mathis (Northeast Area Habitat Specialist, NMDGF)
Mark Watson (Conservation Services Habitat Specialist, NMDGF)

GUIDELINES AND RECOMMENDATIONS
FOR BURROWING OWL
SURVEYS AND MITIGATION

NEW MEXICO DEPARTMENT OF GAME AND FISH

JULY 2007

(Note: Most of the following recommendations were developed by the New Mexico Burrowing Owl Working Group (2005), The California Burrowing Owl Consortium (1993), and The California Department of Fish and Game (1995))

The burrowing owl (*Athene cunicularia*) is considered a species of concern by the U.S. Fish and Wildlife Service and is protected by both the Migratory Bird Treaty Act and by New Mexico statute 17-2-14 (NMSA 1978). These guidelines are provided to assist in conducting burrowing owl surveys and mitigation during the preparation of environmental assessment reports and environmental impact statements. The guidelines also aid in the decision making process implemented when there is potential for any type of project to adversely affect burrowing owls or any of the resources that support them.

Project proponents should: 1) identify burrowing owl habitats and burrows; 2) choose and implement an appropriate survey method to confirm the presence of owls; and 3) determine and implement appropriate mitigation.

Step 1. Identify Burrowing Owl Habitat and Burrows

Seventy-five percent of New Mexico's ecological zones, as described by Dick-Peddie (1993), support or have the potential to support burrowing owls (Arrowood et al. 2001). These zones include: Chihuahuan desert scrub, closed basin scrub, desert grassland, Great Basin desert scrub, juniper savanna, lava beds, plains-mesa grassland, plains-mesa sand scrub, sand dunes, urban, and farmland (Arrowood et al. 2001). More specifically, burrowing owls generally are associated with dry, open, short-grass, treeless plains (Haug et al. 1993). Burrowing owls are also known to use areas that include shrubs such as creosote bush (*Larrea tridentata*), mesquite (*Prosopis* spp.), four-wing saltbush (*Atriplex canescens*), and rabbit-brush (*Chrysothanmus nauseous*) (Martin 1973, Botelho and Arrowood 1996). Burrowing owls also inhabit human-modified landscapes, such as golf courses and parking lots.

Burrowing owls rarely dig their own burrows and, therefore, depend in part upon the presence of burrowing animals. In New Mexico, burrowing owls are associated with Gunnison's prairie dogs (*Cynomys gunnisoni*), black-tailed prairie dogs (*C. ludovicianus*), American badgers (*Taxidea taxus*), ground squirrels (*Spermophilus* spp.), rock squirrels (*S. variegatus*), foxes (*Vulpes* spp.), and coyotes (*Canis latrans*). Burrowing owls and prairie dogs are included as species of greatest conservation need in the western great plain shortgrass prairie vegetation type (Comprehensive Wildlife Conservation Strategy for New Mexico 2006). Burrowing owls can also utilize human-made structures, such as, storm drains, berms, roadsides, irrigation canals, and artificial burrows specifically constructed for the owls.

Occupancy of suitable burrowing owl sites can be verified by observing at least one burrowing owl, or owl molted feathers, cast pellets, prey remains, eggshell fragments, or excrement at or near a burrow entrance (The California Burrowing Owl Consortium 1993).

Step 2. Choose and Implement an Appropriate Survey Method to Confirm Owl Presence

The most suitable time to survey for burrowing owls in New Mexico is during the nest initiation and incubation phases (Table 1). Most burrowing owls are migratory in the state, although some over-winter in New Mexico, particularly males in southern New Mexico (Arrowood et al. 2001, Johnson et al. 1997). Migratory owls typically arrive on the breeding grounds by March and remain there until October.

Table 1. General breeding chronology of the burrowing owl in New Mexico.

Location	Pair Bonding/Nest Initiation	Egg Laying and Incubation	Chicks Fledge above Ground	Independence
New Mexico	March to April	Late April to early June	Early-Mid June	Mid-Late July

Surveys should not be conducted in certain weather conditions when owls are more likely to be in their burrows and not visible, such as temperatures above 30°C (86°F) and winds exceeding 20 km/hr (approx. 12 mph). Surveys also should be restricted to the early morning and evening hours, because above ground activity is often higher during these times (Conway and Simon 2003).

A single survey on a proposed project site is adequate to determine the presence or absence of active burrows. If owls are not observed, all active burrows should be inspected for indications of use by the presence of owl pellets, droppings, or feathers. If active burrows are found follow-up survey, utilizing the methods described below, should be scheduled to confirm the presence or absence and numbers of owls on a project site.

Burrowing owl surveys can be accomplished effectively by either walking or driving transects. Either the entire length of the transect or point count stations along the transect can be surveyed, and surveys can be conducted with or without broadcasting audio burrowing owl alarm (*quick-quick-quick*) and/or male territory (*coo-coo*) calls. Studies have shown that broadcasting calls increases detection probability of burrowing owls (Haug and Didiuk 1993, Conway and Simon 2003) and that trained surveyors can detect owls up to 300 m (Conway and Simon 2003). These methods might need to be modified depending upon the terrain and equipment being used, which, respectively, affect the distance owls and the broadcasted vocalizations can be heard.

If burrowing owl habitat is found at the project site, a 150-m buffer zone around the project should also be assessed for potential burrowing owl habitat. At the project site, use one of the following survey methods as recommended by the New Mexico Burrowing Owl Working Group (NMBOWG).

METHOD 1: Walking Surveys

Without Audio Calls

Transects should be established in suitable owl habitat. A single, straight line should be walked for the entire length of the transect (for specific protocol and comparison of line transect methodology see Emlen 1971 and 1977). Observers should record all owls observed along either side of the line. If a more thorough estimate of abundance in a specific area is desired, an observer should walk multiple parallel lines (or many observers walk parallel lines concurrently) that are approximately 50 m apart. All owls observed along either side of the transect line should be recorded. Data recorded should include: date and time of survey, weather conditions, dominant vegetation, burrow aspect, survey location (including GPS coordinates), number of owls observed, sex and age classes of owls (if determinable), and presence of prairie dogs and other burrowing animals.

With Audio Calls

Observers should proceed along a transect line, stopping at points approximately every 200 m to broadcast owl vocalizations and listen for responses. Distance between points will depend upon terrain and broadcast system , which, respectively, affect the distance owls and the broadcasted vocalizations can be heard. If the broadcast system and owl response calls, can be heard up to 200 m. then the observer should stop every 200 m. The distance between observation points can be shortened if necessary. If a more thorough estimate of abundance is desired, the observer should walk multiple parallel lines (or many observers walk parallel lines concurrently) to cover a greater proportion of the area. The lines should be spaced according to the same distance of audio coverage. At each observation point, the observer should scan for any owls with binoculars for the first two minutes, after which a territorial and/or alarm calls should be played for one minute. Finally, there should be two additional minutes of scanning after broadcasting. Scanning and broadcasting should be done in a 360° arc. All owls detected during this five-minute observation period should be recorded. Data recorded should include: date and time of survey, weather conditions, dominant vegetation, burrow aspect, survey location (including GPS coordinates), number of owls observed, sex and age classes of owls (if determinable), and presence of prairie dogs and other burrowing animals.

METHOD 2: Roadside Point-count Surveys

Without Audio Calls
Routes should be established along roads in the project site. Observers should stop the vehicle and pull off the side of the road at 0.5-mile (0.8 km) intervals (if project site is large enough). If visibility is impaired at a point, observers should continue until the next immediate suitable surveying spot is reached. All surveyors should exit the vehicle at each point and scan with binoculars in a 360° arc for a total of five minutes. All owls detected during this five-minute observation period should be recorded. Data recorded should include: date and time of survey, weather conditions, dominant vegetation, burrow aspect, survey location (including GPS coordinates), number of owls observed, sex and age classes of owls (if determinable), and presence of prairie dogs and other burrowing animals.

With Audio Calls
Routes should be established along roads in the project site. Observers should stop the vehicle and pull off the side of the road at 0.5-mile (0.8km) intervals (if project site is large enough). If visibility is impaired at a point, observers should continue until the next immediate suitable surveying spot is reached. Observers should exit the vehicle at each point and scan for the first two minutes. Afterwards, owl calls (territorial and/or alarm) should be played for one minute, followed by two additional minutes of scanning. Scanning should be done with binoculars in a 360° arc. All owls detected during this five-minute observation should be recorded. Data recorded should include: date and time of survey, weather conditions, dominant vegetation, burrow aspect, survey location (including GPS coordinates), number of owls observed, sex and age classes of owls (if determinable), and presence of prairie dogs and other burrowing animals.

Step 3. Determine and Implement Appropriate Mitigation

The objectives of these mitigation guidelines are to minimize the negative impacts to burrowing owls at a project site and preserve habitat that will support burrowing owl populations into the future. The mitigation process begins with the survey protocol to document the presence of burrowing owl habitat, and to determine if burrowing owls use the project site and the surrounding buffer zone. Occupied burrows should be determined based on survey information. If more than 30 days elapse between the initial survey and construction activities, project sites and buffer zones with suitable habitat should be resurveyed to ensure no burrowing owls have occupied these areas in the interim period. Resurveying the project site should be conducted no more than 30 days prior to initial project initiation. If ground disturbing activities are delayed or suspended for more than 30 days after the preconstruction survey, the site should be resurveyed.
If burrowing owls are present on a project site, the following mitigation measures should be followed to minimize negative impacts to burrowing owls, nest burrows and burrowing owl habitat.

According to the California Burrowing Owl Consortium there are three definitions of negative impacts:

- Disturbance or harassment within 50 m of occupied burrows.
- Destruction of burrows and burrow entrances. Burrows include structures such as culverts, concrete slabs and debris piles that provide shelter to burrowing owls.
- Destruction and/or degradation of foraging habitat adjacent to occupied burrows (within 100 m).

If burrowing owls are found at a project site, measures to avoid or mitigate negative impacts should follow one of three general approaches. These approaches are listed below:

1. Design and implement project activities to spatially avoid negative impacts and disturbance to burrowing owls and their habitat.

    - No disturbance should occur within 50 m of occupied burrows during the non-breeding season (September through February) or within 75 m during the breeding season (March through August). Avoidance also requires that a minimum of 6.5 acres of foraging habitat be maintained in undisturbed habitat condition for each pair or unpaired burrowing owl.
    - No disturbance or destruction of any prairie dogs or other burrowing animals or their burrows, should occur within the owl avoidance areas.

2. Design and implement project activities to seasonally avoid negative impacts and disturbances to burrowing owls.

    - Occupied burrows should not be disturbed during the nesting period, from March 1st through August 1st.
    - No disturbance or destruction of any prairie dogs or other burrowing animals or their burrows, should occur within the owl avoidance areas.
    - When destruction of burrows is unavoidable, burrow destruction or ground disturbing activities should only occur during the season when migratory owls have left the breeding site. The unoccupied season can be expected to begin in September or October and end in February or March. However, burrowing owl occupancy always must be confirmed by survey data, regardless of season. Immediately prior to burrow destruction a video probe should be used to confirm that the burrow is unoccupied.
    - For any occupied burrows that are destroyed outside of the nesting season, any remaining, undestroyed, burrows should be enhanced (enlarged or cleared of debris) or new burrows should be created (by installing artificial burrows) at a ratio of 2:1 on the protected lands site. A minimum of 6.5 acres of foraging habitat should be maintained in an undisturbed habitat condition for each pair or unpaired resident bird.
    - To ensure compliance with the federal Migratory Bird Treaty Act and state laws and regulations, the U.S. Fish and Wildlife Service and New Mexico Department of Game and Fish must be contacted to confirm that any construction activities resulting in destruction of burrows will not result in a taking of burrowing owls and, thus, violation of federal and state law.

3. Relocate burrowing owls that will be negatively impacted by project activities to protected areas of potential burrowing owl habitat.

    - If owls must be moved away from the disturbance area, passive relocation techniques should be used rather than trapping. At least one or more weeks will be necessary to accomplish this and to allow the owls to acclimate to alternate burrows. Passive relocation can be accomplished by use of one-way doors. Owls should be excluded from burrows in the immediate negatively impacted zone and within a 50-m buffer zone by installing one-way doors in burrow entrances. One-way doors should be left in place for approximately 48 hours to ensure that owls have left burrows before excavation. Prior to burrow destruction a video probe should be used to confirm that the burrow is unoccupied. If a video probe is not available burrows should be excavated with hand tools to ensure that the burrows are unoccupied. Two natural or artificial burrows should be provided for each burrow in the project area that will be rendered biologically unsuitable. Passive relocation should only be used during the non-breeding season,. This method should not be used once a pair of owls is at a burrow unless it is determined that the female does not exhibit a brood patch.
    - If removal or relocation is necessary, trapped burrowing owls should be released in a new location with suitable habitat in a soft release cage. Soft release involves placing owls in a cage with an artificial burrow and fed mice daily for three weeks. After three weeks one side of the cage is removed. More information on this technique is available from NMBOWG.
    - A minimum of 6.5 acres of foraging habitat should be maintained in an undisturbed habitat condition for each pair or unpaired resident bird. No disturbance or destruction of any prairie dogs or other burrowing animals or their burrows, should occur within the owl avoidance areas.
    - To ensure compliance with the federal Migratory Bird Treaty Act and state laws and regulations, the U.S. Fish and Wildlife Service (505-248-7882) and New Mexico Department of Game and Fish (505-476-8101) must be contacted and federal and state permits must be obtained for handling of owls.

Links

New Mexico Burrowing Owl Working Group
http://www.hawksaloft.org/BUOW/BUOW.htm

Use of Artificial Burrows by Burrowing Owls at the HAMMER Facility on the U.S. Dept. of Energy Hanford Site
http://www.pnl.gov/main/publications/external/technical_reports/PNNL-15414.pdf

How to Install Artificial Nesting Burrows for Burrowing Owls
http://www.usga.org/turf/articles/environment/general/Burrowing-Owl-Brochure.pdf

Artificial Burrowing Owl Burrow Design
http://www2.ucsc.edu/scpbrg/artifici.htm

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

April 27, 2009

Cons. # 22420-2009-FA-0046

Mr. Donald Calder
ACC Project Manager
HQ ACC/A7PS
129 Andrews Street, Suite 102
Langley AFB, Virginia 23665-2769

Dear Mr. Calder:

Thank you for your request for conferencing and concurrence on the Draft Environmental Assessment for Beddown of a Second Field Training Unit (FTU) and Relocation of an Existing FTU for unmanned Aircraft Systems, dated March 12, 2009 (Draft EA). You determined that your proposed project "may affect, but is not likely to adversely affect" the northern aplomado falcon (falcon) (*Falco femoralis septentrionalis*) the interior least tern (*Sterna antillarum athalassos)*, the Southwestern willow flycatcher (flycatcher) (*Empidonax trailii extimus*), and the Mexican spotted owl (owl) (*Strix occidentalis lucida*). We appreciate your intent to avoid adverse effects to these four species. However, the Draft EA does not contain sufficient information for the U.S. Fish and Wildlife Service (Service) to conference on the falcon or concur on the other three species with your determinations. Sufficient information must be provided to the Service to make a "not likely to adversely effect" or "likely to adversely effect" determination in informal consultation, or a jeopardy/adverse modification or non-jeopardy/no adverse modification determination. We hope the following items will help illustrate the kinds of information we need, and we do not anticipate that any of this should be difficult to obtain.

1. The proposed project is located within historic falcon habitat which was listed as an endangered species on February 25, 1986 (51 FR 6686). On July 26, 2006 (71 FR 42298) the reintroduced falcon population was designated as "nonessential experimental" and does not require land managers to specifically manage for reintroduced falcons. When nonessential experimental populations are located outside a National Wildlife Refuge or in a unit of the National Park System, the Service treats the nonessential experimental population as proposed for listing and two provisions of the Endangered Species Act (ESA) apply: section 7(a)1 and section 7(a)4. Section 7(a)1 requires Federal agencies to use their authorities to further the conservation of listed species. Section 7(a)4 requires Federal agencies to confer (rather than consult) with the Service on actions that are likely to jeopardize the continued existence of a proposed species. The results of a conference are advisory in nature and do not restrict agencies from carrying out, funding, or authorizing activities.

Conferencing under section 7 of the Endangered Species Act (ESA) may not be a term you are familiar with. Species and critical habitats proposed in the *Federal Register* for listing are subject to the conferencing process established in 50 CFR § 402.10, Conference on Proposed Species or Proposed Critical Habitat. The Service treats the nonessential experimental falcon population as proposed for listing. Conference is a process of early interagency coordination, similar to consultation, involving informal or formal discussions between a Federal agency and the Services pursuant to Section 7(a)(4) of the ESA regarding the potential impact of a project or action on proposed species or proposed critical habitat. The conference procedure is designed to help Federal agencies identify and resolve potential conflicts between Federal projects and species conservation by developing recommendations to minimize or avoid adverse effects on proposed species or proposed critical habitat.

Informal conference on proposed species or critical habitat may be carried out by the action agencies. If a determination is made that a proposed Federal project is likely to jeopardize a species or destroy, or adversely affect, critical habitat proposed for listing under the ESA authorities, a formal conference is required and must be initiated by the action agency. During the conference process, the Services will make advisory recommendations on ways to avoid or minimize adverse effects.

You may ask the Service to confirm the conference report as a letter of concurrence issued through informal consultation if the status of the nonessential experimental falcon population is changed by the Service. The request must be in writing. If the Service reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, the Service will confirm the conference report as the letter of concurrence on the project and no further section 7 consultation would be necessary.

2. We would like to request a more detailed description of the falcon habitat in the action area of your project, an action area that is often larger than the "project area." For more information about "action area" and other terms, please see the attached "Suggested Contents for Biological Assessments or Evaluations."

3. If possible, we request that you include in the project description that you will survey the action area for falcons prior to implementing your project, and if falcons are located in the action area of your project, that you will contact the New Mexico Ecological Services Field Office for further consultation. Photographs of the action area would be helpful to identify falcon habitat components. If you have information about the timing of your project at this stage of planning, that would also be helpful. The falcon nesting season extends from approximately March 1 through July 31, and they can begin courting in early February and fledglings may be present through August 31. Therefore, if falcons are nesting in your action area, the effects of your project may change depending on its timing.

Falcons also frequently choose to nest in abandoned raven and large raptor nests on power poles or towers, and are not only found nesting in trees, such as yuccas and mesquites. If these artificial structures are in the action area of your project where a falcon nest could be subject to human disturbance factors, then the poles and towers should be surveyed for nesting falcons. If your habitat surveys reveal that there is no suitable nesting habitat in the area, but that it contains suitable falcon grassland foraging habitat, then we would recommend that falcon surveys be conducted to determine whether a territorial falcon was resident in the area and using it during any time of year, not just during the nesting season. Their territories are large and on average extend about 2 miles in radius. Your assessment states that falcons are known to occur on the Holloman base; therefore, there may be suitable nesting and/or foraging habitat in your action area. Since much of the project area consists of a previously disturbed artificial site, then a remaining question would be: "Is there potential for human disturbance of territorial or nesting falcons within the action area, which can frequently extend beyond the project area?" To answer this, you would need to survey to determine if falcons were within the action area of your project, such as nesting on a power pole, even though the project area consists of a previously disturbed site.

The attached 2003 "Interim Survey Methodology for the Northern Aplomado Falcon (*Falco femoralis septentrionalis*) in Desert Grasslands" contains sections that apply to project-related surveys for falcons. This document is also sent to biologists when they receive a Scientific and Recovery Endangered Species Permit from the Service to survey for falcons in New Mexico, Texas, or Arizona. Such a permit is required to survey for falcons in these States. If you are interested in applying for one, please contact Vanessa Martinez at (505) 248-6665 for more information and review of our permits please visit our website at http://www.fws.gov/endangered/permits/index.html. If you have any questions about either of the attachments or this message please contact Dr. Patricia Zenone at (505)-761-4718 or <patricia_zenone@fws.gov>.

4. For the interior least tern, please provide additional information about the occurrence of interior least terns at Lake Holloman and about their nesting activity at the Lake, which is briefly mentioned in your Draft EA.

5. The Draft EA indicates there could be marginal habitat for the flycatcher within the woodland area at LHWC. The Draft EA does not describe if presence/absence surveys were or will be conducted at LHWC. We are including the flycatcher survey protocol and the website for your consideration and information. Survey protocol training is required prior to conducting flycatcher surveys please contact Scott Durst at (505)-761-4739 for specific survey protocol training dates, locations and availability. The flycatcher website is http://sbsc.wr.usgs.gov/cprs/research/projects/swwf/wiflnew.asp

   For more general information on the flycatcher please visit
   http://sbsc.wr.usgs.gov/cprs/research/projects/swwf/wiflnew.asp

6. The Draft EA does not provide the following information concerning the owl.

    a. Number or frequency of MQ-1 and MQ-9 overflights occurring over owl critical habitat;
    b. The will the noise level from the MQ-1s and MQ-9s and flight attitude over owl critical habitat; and
    c. Affects to owls and/or protected activity centers located in overflight areas.

The Service recommends that the U.S. Air Force use additional published reports to help support its effects determination for the owl. We have included, as an enclosure, one published report titled *Responses of Mexican Spotted Owls to low-flying Military Jet Aircraft*, written by Charles L. Johnson and Richard T. Reynolds in Rocky Mountain Research Station, Research Notes RMRS-RN-12, 2002. The U.S. Air Force Air Combat Command conducted a study to determine the effects of low-attitude military jet aircraft overflights on Mexican spotted owl. The annual reports provided by the study are also a good source of aircraft noise effects on owls. If you have any questions about the owl or the enclosure please contact Lynn Gemlo at (505)-761-4726 or <lynn_gemlo@fws.gov>.

Thank you for the opportunity to comment. In future communication regarding this project, please refer to Consultation #22420-2009-FA-0046. We look forward to working with you on your request for conferencing on the falcon and concurrence on the interior least tern, the owl, and the flycatcher on this project. If you have any questions, concerning this consultation please contact please contact Santiago Gonzales of my staff at the letterhead address or at (505) 761-4720.

Sincerely,

Wally Murphy
Field Supervisor

Enclosures

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division, Santa Fe, New Mexico

PROOF OF PUBLICATION

(2015.5 C.C.P.)

STATE OF CALIFORNIA } ss

County of Los Angeles

The space above for filing stamp only

NOTICE OF AVAILABILITY DRAFT ENVIRONMENTAL ASSESSMENT

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer of the **Antelope Valley Press**, a newspaper of general circulation, printed and published **daily** in the city of **Palmdale**, County of Los Angeles, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Los Angeles, State of California, under date of October 24, 1931, Case Number 328601; Modified Case Number 657770 April 11, 1956; also operating as the Ledger-Gazette, adjudicatec a legal newspaper June 15, 1927, by Superior Court de No. 224545; also operating as the Desert Mailer News, formerly know the South Antelope Valley Foothill News, adjudicated a newspape general circulation by the Superior Court of the County of Los Ang State of California on May 29, 1967, Case Number NOC564 adjudicatec a newspaper of general circulation for the City of Lanca State of California on January 26, 1990, Case Number NOC10 Modified October 22, 1990; that the notice, of which the annexed printed copy (set in type not smaller than nonpareil), has been publishe each regular and entire issue of said newspaper and not in any supple thereof on the following dates, to-wit:

March 15, 2009

I certify (or declare) under penalty of perjury that the fore-going is true and correct.

Signature

Dated: March 15, 2009
Executed at Palmdale, California

NOTICE OF AVAILABILITY DRAFT ENVIRONMENTAL ASSESSMENT FOR THE MQ-1 PREDATOR AND MQ-9 REAPER UNMANNED AIRCRAFT SYSTEM (UAS) SECOND FIELD TRAINING UNIT (FTU-2) BEDDOWN

This announcement provides public notification for the availability of the draft Environmental Assessment (EA) and draft Finding of No Significant Impact (FONSI) prepared by the U.S. Department of the Air Force and U.S. Army Corps of Engineers Sacramento District for the beddown of a MQ-1 Predator and MQ-9 Reaper Unmanned Aircraft System (UAS) second Field Training Unit (FTU) and relocation of an existing FTU from Creech Air Force Base (AFB), Nevada. The draft EA discusses the potential environmental effects of the proposed construction and renovation of the UAS training facilities and the operation and maintenance of the MQ-1/MQ-9s. Two bases, Holloman AFB, New Mexico and Edwards AFB, California are being evaluated as potential sites for the proposed beddown. The draft EA and draft FONSI will be available for review for 30 days beginning Monday March 16, 2009. Copies are available for review at the following public libraries: Kern County Library (Wanda Kirk [Rosamond] Branch), 3611 Rosamond Blvd., Rosamond, CA 93560; Edwards AFB Library, 5 W Yeager Blvd., Building 7210, Edwards AFB, CA 93524; Lancaster Public Library, 601 W Lancaster Blvd., Lancaster, CA 93534; Alamogordo Public Library, 920 Oregon Ave., Alamogordo, NM 88310; and Holloman AFB Library, 598 Fourth St., Bldg. 224, Holloman AFB, NM 88330. The draft EA and draft FONSI are also available for review and downloading from Air Combat Command's internet web page at the following url address http://www.accplanning.org/documents/EAs/Draft_Ea_FTU-2_11_Mar09.pdf. Comments and requests for copies should be sent to Mr. Don Calder, ACC-A7PS, Department of the Air Force, Headquarters Air Combat Command, 129 Andrews Street, Suite 102, Langley Air Force Base, Virginia 23665-2769 or emailed to Donald.Calder@langley.af.mil. Publish: 3/15/09

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AFFIDAVIT OF PUBLICATION

ALAMOGORDO,
STATE OF NEW MEXICO
COUNTY OF OTERO. **ss.**

I, MIKE BELL, being duly sworn, on my oath say that I am the Publisher of the Alamogordo Daily News, a Newspaper of daily circulation, published and printed in the English language at the City of Alamogordo, Otero County, State of New Mexico. That the Alamogordo Daily News has been regularly published and issued for more than nine months prior to the date of the first publication hereinafter mentioned.

That the attached notice was published 1 time in 1 issue of said newspaper and not in any supplement thereof, the first publication being on March 15th, 2009.That said notice was published in accordance with the laws of the State of New Mexico.

Publisher

Subscribed in my presence and sworn before me this the 19 day of March 2009.

Notary Public

My commission expires 7/3/2010

Legal Number: 1676

Legal # 1676
(Published 3/15/2009)

NOTICE OF AVAILABILITY DRAFT ENVIRONMENTAL ASSESSMENT FOR THE MQ-1 PREDATOR AND MQ-9 REAPER UNMANNED AIR CRAFT SYSTEM (UAS) SECOND FIELD TRAINING UNIT (FTU-2) BED DOWN

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MAR 1 8 2009

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NOTICE OF AVAILABILITY
DRAFT ENVIRONMENTAL ASSESSMENT
FOR THE MQ-1 PREDATOR AND MQ-9 REAPER
UNMANNED AIRCRAFT SYSTEM (UAS)
SECOND FIELD TRAINING UNIT (FTU-2)
BEDDOWN

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_____ of said

County and State being duly sworn, says:

That he is and at all times herein mentioned was a citizen of the United States, over 21 years of age, and not a party to nor interested in the above entitled matter; that he is a principal clerk of the printers and publishers of the LOS ANGELES TIMES a newspaper printed and published daily in the said Los Angeles County; that the

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in the above entitled matter of which the annexed is a printed copy, was published in said newspaper

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202 West First St. Los Angeles, CA. 90012

on the following days, to-wit:
Sun; March 15, 2009

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By _____

State of California
County of Los Angeles

Subscribed and sworn to (or affirmed) before me on this
16th (Date) day of March (Month), 2009 (Year), by
(1) Angelina De Cordova (Name of Signer),
proved to me on the basis of satisfactory evidence
to be the person who appeared before me (.)

FELIPE ALCALA DIAZ
Commission # 1759331
Notary Public - California
Los Angeles County
My Comm. Expires Aug 26, 2011